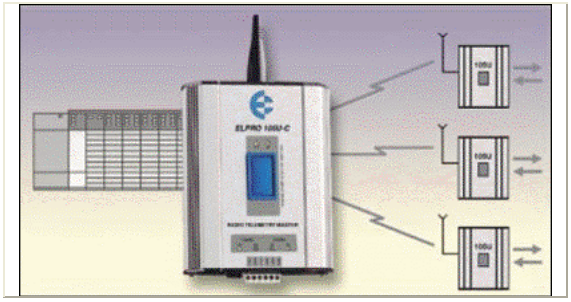
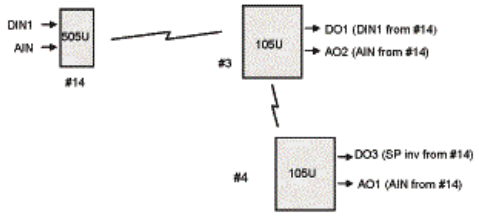
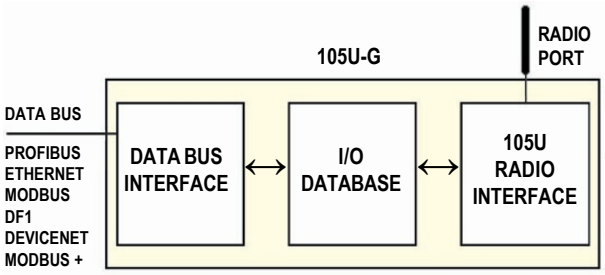
ELPRO 105U Trådløse I/O Alternativ til dyre kabler		Mange muligheder se datablad.
ELPRO 105U-G Trådløse Gateways		Modbus / DF1 Profibus Slave Profibus Master Ethernet DeviseNet Slave eller Modbus Plus Slave
ELPRO 105S I/O udvidelse – Serial Telemetry		Udvidelse af til 105U Mange muligheder se datablad.
ELPRO 405U Radiomodem		RS232 eller RS485 via radio
ELPRO 505U Fjernovervågning over radio **ELPRO 505U-K** Trådløs I/O Moduler		Radiooverføring Fjernovervågning, alarm, målere og analoggivere
ELPRO 805U-E Trådløs Industriel Ethernet		10/100 MHz Ethernet connection, plus RS232/485 data ports Op til 76.8 Kb/s trådløse data

0907

Wireless connectivity between different data buses - Profibus, Ethernet, Modbus, DF1, DeviceNet, Modbus Plus

Interface between Wireless I/O and DCS/PLC/HMI

The 105U-G Wireless gateway products provide a wireless interface between various data buses used in process and automation applications. The 105U-G includes an integral radio transceiver, and transfers transducer and control signals (I/O) using a highly secure and highly reliable radio protocol.



The 105U radio protocol is designed for very efficient radio usage, with configurable communications based on event reporting (I/O change), update times and/or poll response. Other features are:

high security data encryption
automatic acknowledgment and error-correction,
peer to peer addressing, and
mulitple path routing

Applications include:

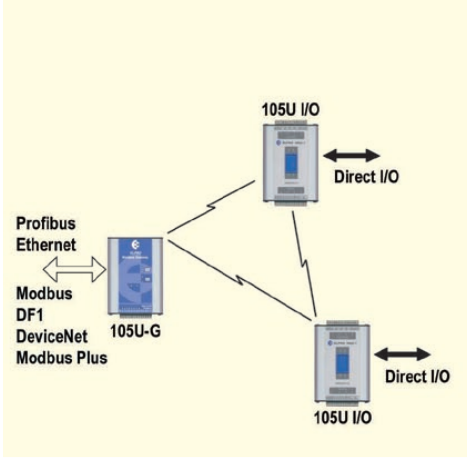
- The 105U-G interfaces between 105U wireless I/O and various data buses. Connect wireless I/O to PLC's, DCS, SCADA or Internet.
- Wireless extension of factory automation buses such as Profibus and Ethernet.
- Wireless interconnectivity between different data buses - Ethernet to Profibus to Modbus to DF1.
- Combined networks of the above, forming an Elpro WIB ("Wireless Instrumentation Backbone")

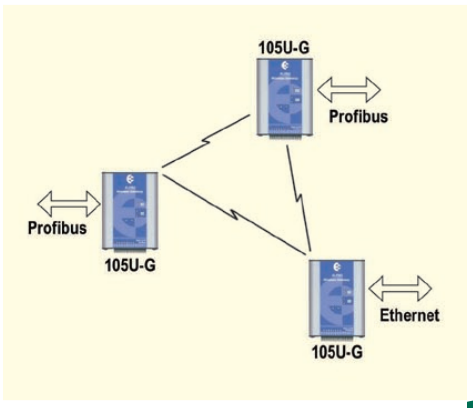
The 105U-G modules also have eight on-board discrete I/O, individually configurable as input or output.

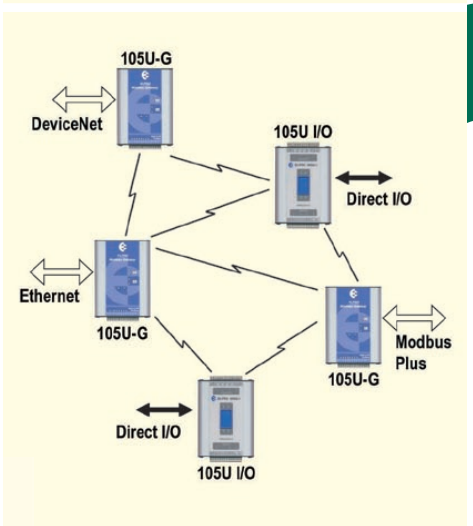
Network configuration is performed with easy-to-use free software. I/O links are configured between different modules in the network.

Ordering information:

105U-G-MD1	Modbus Master, Modbus Slave, DF1 interface
105U-G-PR1	Profibus DP Slave interface
105U-G-ET1	Ethernet IP / Modbus TCP / HTTP-FTP-Email
105U-G-DE1	DeviceNet Slave interface
105U-G-M+1	Modbus Plus Slave interface







GreenMatic I Lundeager 24 I 2791 Dragør I Tel. 7020 4840 I Fax 7020 4847 I www.greenmatic.dk

Specifications

Power Supply

9 – 30VDC / 12 – 24VAC
Battery charging circuit included for 12V back-up battery, max charge current regulated to 0.7A (>12V supply)
Normal current drain
Modbus / DF1 version 12V 150mA; 24V 90mA
Profibus / Ethernet 12V 270mA; 24V 170mA
Add 5mA per active I/O
Current drain during radio transmission - add to above
12V 350mA; 24V 200mA

General

Modbus/DF1 version
-20 to 60 degC, 0 - 99 %RH
Profibus / Ethernet / DeviceNet / Modbus Plus
0 to 60 degC, 0 - 95 %RH
EMC Compliant EN55022, EN50082-1, FCC Part 15
Housing - extruded aluminium case 130 x 185 x 60 mm, DIN rail mounting, removable terminal blocks for ease of module replacement, terminals suitable for 2.5sqmm wire
LED indication for processor OK, radio TX and RX, serial TX and RX, active status.

I/O Capacity

Modbus / DF1 4300 I/O points (analog plus discrete)
Profibus 416 I/O bytes
up to 1952 discrete inputs / 1952 discrete outputs
or up to 122 analog in / 122 analog out
Ethernet 2048 bytes input and 2048 bytes output
up to 4300 discrete I/O points
or up to 1024 analog in / 1024 analog out
DeviceNet 512 bytes input and 512 bytes output
up to 4300 discrete I/O or
up to 256 analog in / 256 analog out
Modbus Plus 2048 bytes input and 2048 bytes output
up to 4300 discrete I/O or
up to 1024 analog in / 1024 analog out
Register size 16 bit
Number of remote 105U addresses 500

Radio Transceiver

Single channel, synthesised, direct frequency modulation.
Frequency 405-490 MHz, 12.5KHz channels, 10-500mW, 5W
220-230 MHz, 25KHz channels, 5W
869.525 MHz, 250KHz channel, 500mW
Approved to EN 300 220, AS4268.2, RFS29
Expected line-of-sight range, with unity gain antennas
10mW - 2km; 500mW - 5km(869Mz) / 10km (400MHz);
5W - 40km (220MHz) / 30km (400MHz)
Range may be extended by up to four intermediate repeaters.

Radio Transmission

Radio communications can be configured for combination of event reporting (change-of-value), update time, read/write blocks and poll response.
Radio message includes system addressing, unit addressing, error-checking and configurable security encryption.
Communication control includes message acknowledgments and up to four re-transmissions.
Peer to peer addressing. Messages may be routed thru four intermediate repeater addresses.
Fail-to-transmit and fail-to-receive alarms configurable

Modbus Specification

Modbus RTU (binary), master / slave configurable.
RS232 or RS485, 300 - 19200 bits/sec.

DF1 Specification

Allen-Bradley DF1 full-duplex.
RS232 only, 300 - 19200 bits/sec.

Profibus

Profibus-DP Slave functionality according to EN 50170.
RS-485 optically isolated with on-board DC/DC converter, automatic baudrate detection (9600 bit/s - 12 Mbit/s)

Ethernet

10/100 Mbit/s, RJ45 transformer isolated interface
Modbus/TCP class 0, class 1 and partially class 2 slave
EtherNet/IP level 2 I/O Server
Embedded Web system (Dynamic HTTP), on-board file system (1.4MB flash disc), user downloadable web pages through FTP server, Email functionality (SMTP)

DeviceNet

DeviceNet 2.0 Slave, optically isolated RS422 with selectable baudrate 125, 250 and 500 Kbit/sec.

Modbus Plus

Modbus Plus Slave, optically isolated RS485 with standard baudrate of 1 Mbit/sec, global data base transactions with routing for up to six networks.

On-board I/O

Eight discrete I/O, individually configurable as input or output. Inputs suitable for voltage free contacts.
Outputs are FET, 30VDC 500mA.

Configuration & Diagnostics

Configuration via free Windows software
Diagnostics include on-line read/write of I/O registers, radio signal strength values from remote units, and off-line testing of data bus protocol.

0508

ELPRO 105U-G-PR

Wireless Profibus DP interface, to 12Mbit/sec

Uses 869MHz 500mW license-free radio band

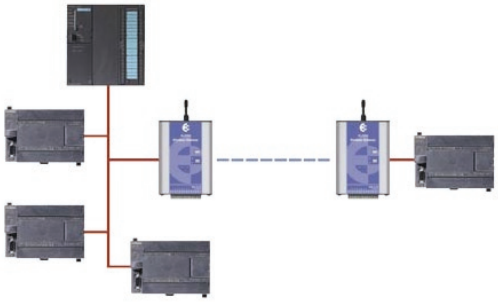
Up to 5km line-of-sight, 500 to 1000 metres in congested industrial environments

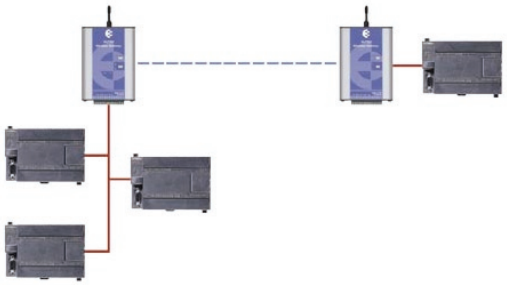
Also 450MHz 5W licensed radio, 50+ km

Can act as a Profibus Slave to extend existing Profibus networks,

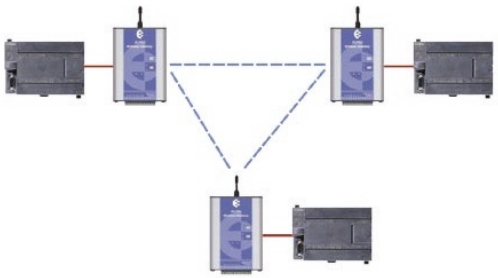
Provides secure Firewall isolation

Typical response time 30 msec (for transfer of 64 digital values)

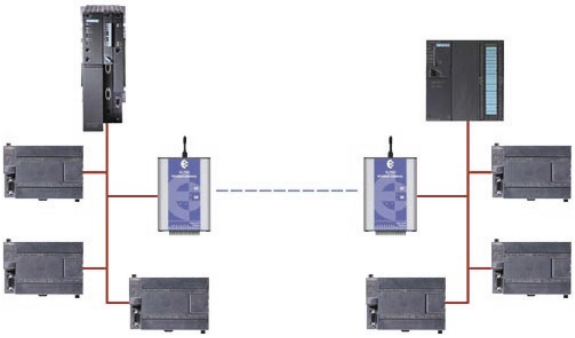




Wireless unit can also act as Profibus Master, connecting to up to 125 Profibus Slaves



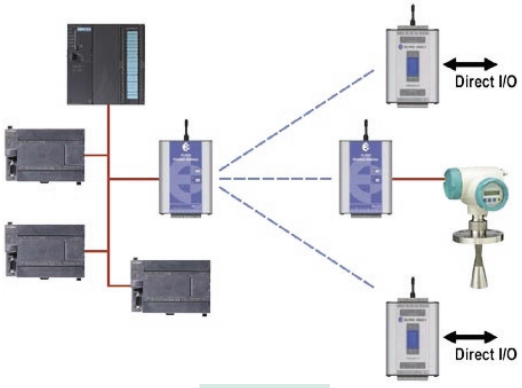
Up to 95 Wireless units can connect in a peer-to-peer network



Connect separate Profibus LAN's using a secure Firewall

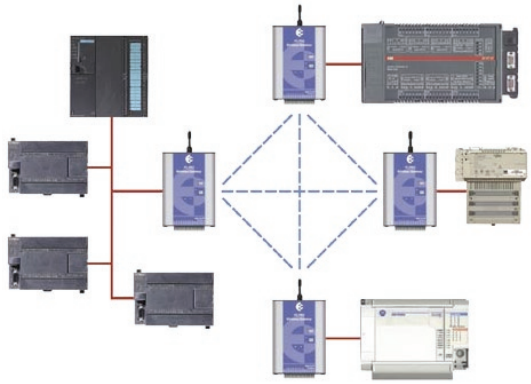
Wireless transmissions protected by security encryption

Connect remote Profibus sensors and I/O



0908

Wireless Profibus DP



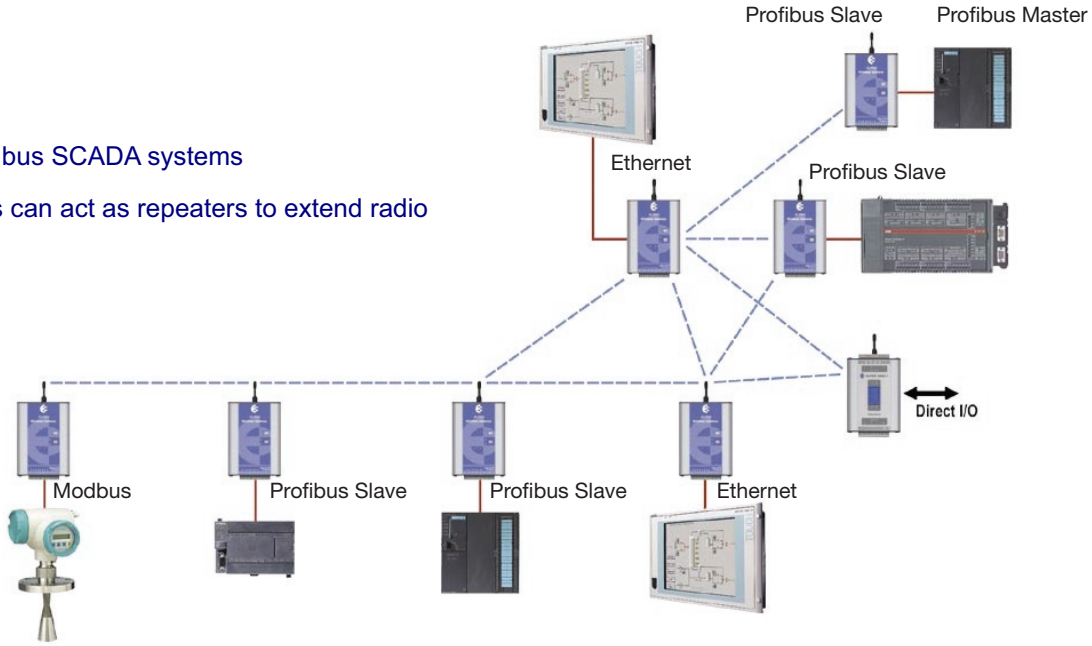
Interconnect other data buses and PLC's

Wireless protocol conversion - connect to Modbus, DF1, EtherNet IP, Modbus TCP, DeviceNet, Modbus Plus

Internet enabled via internal 1.4 MB embedded web system (dynamic HTTP) with event activated email functionality

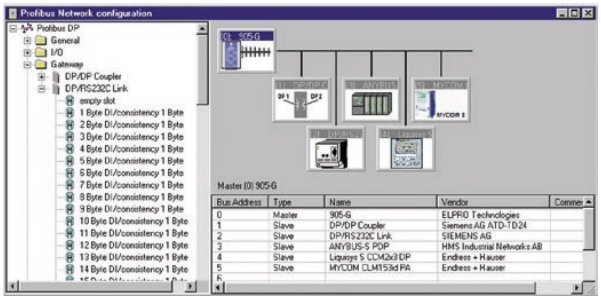
Wireless Profibus SCADA systems

Wireless units can act as repeaters to extend radio distance



Easy to use, drag and click configuration

Configuration and diagnostic software supplied at no additional cost



0908

INDUSTRIAL WIFI

240U-E Wireless Ethernet

The 240U-E provides reliable and secure high-speed wireless Ethernet connectivity across a broad range of applications in process and automation plants.

- **802.11b** compliant 2.4 GHz license-free, wireless data up to 11Mb/s
- Connects to PLC's, HMI, DCS, data acquisition, video devices and industrial PC's

Greater flexibility in one unit

Each module can be configured as a

- ☑ Access Point
- ☑ Bridge
- ☑ Repeater
- ☑ Client/Station
- ☑ Router

The 240U-E has an Ethernet port (10/100 BaseT) as well as two serial ports (RS232 and RS485) and on-board I/O for local and remote link status, or external status transfer.

Industrial strength for industrial applications

The 240U-E has been designed and built for demanding industrial applications.

- **Reliable data transfer** in congested industrial environments - high RF power and receiver sensitivity
- **Industrial ratings**, –35 degC to 65 degC, humidity to 99% - designed for demanding applications
- **Secure data transfer**, military grade 128-bit AES encryption, plus commercial grade WEP encryption
- **Firewall protection** via message filtering at MAC address level
- **Redundancy** for critical applications, automatic changeover at Access Point
- **Easy to use** configuration and powerful diagnostics via web-browser
- **Remote configuration** and diagnostics via the wireless link.

Long & short range applications

- **High RF output** (100 or 300 mW) and superior receiver sensitivity gives excellent penetration in congested industrial environments, through buildings, factory walls and steelwork.
- **Repeater functionality** increases wireless range even further

Lifetime Warranty & first-class technical support

ELPRO's industry-first **Lifetime Warranty** with 24 hour telephone technical support means you can use the 240U-E with confidence.

0508

240U-E 802.11b Wireless Ethernet

SPECIFICATIONS

Ethernet

10/100 BaseT RJ45, IEEE 802.3 compliant.
Bridge/router functions work with all Ethernet protocols
Embedded Protocols:
TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET

Serial

RS232 V.24 DCE 1.2 to 115.2 Kb/s
RS485 1.2 to 115.2 Kb/s

Discrete I/O

One I/O channel
Input voltage-free contact / Output FET 30VDC 500mA

Networking

Configurable as Access Point or Client, Bridge or Router
Point-to-point, Point-to-multipoint, user configurable addressing
Repeater functionality MAC Filtering - whitelist or blacklist
Serial gateway TELNET, PPP (RS232)

Wireless

2.400 – 2.484GHz Direct Sequence Spread Spectrum (DSSS), 13 selectable zones
802.11b compliant, auto rate selection 1-11Mb/s
Transmit power 100mW (20dBm) / 300mW (25dBm)
Receiver sensitivity < 8% FER -96dBm @ 1Mb/s,
-91dBm @ 11Mb/s
Line-of-sight range 1km @ 100mW (Europe)
3 miles / 5km @ 300mW (America)
Range may be extended using repeater features
Dual SMA coaxial antenna connectors for antenna diversity

Security

Security encryption 40 and 104 bit WEP; plus WPA1 (TKIP) and WPA2 (128/bit AES)
MAC Address filtering Password protected configuration

On-line Configuration and Diagnostics

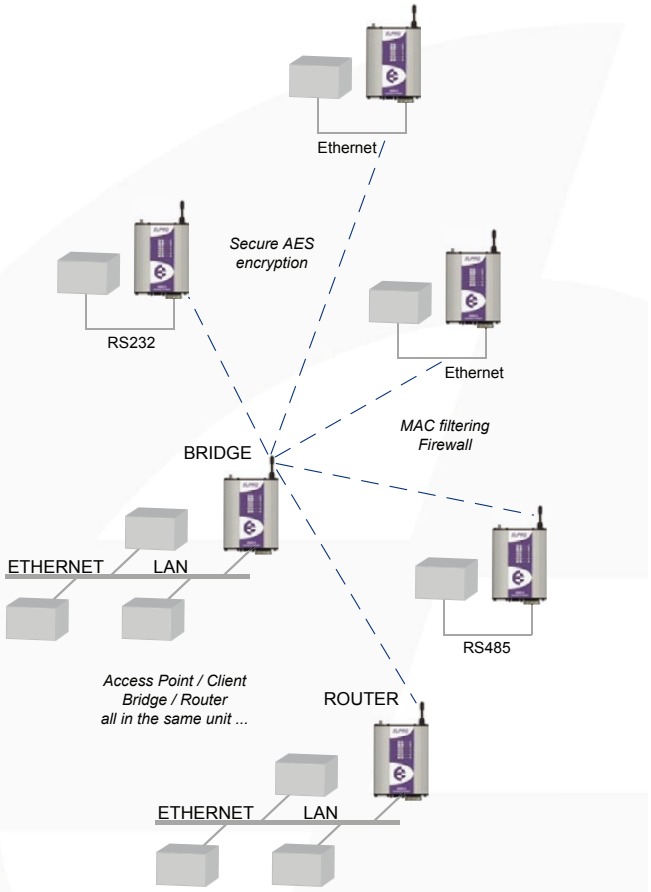
HTTP with remote configuration via wireless link
Web based system management - RF signal strength, Bit Error Rate, connection monitoring and statistics
PPP Protocol Access to diagnostics
Firmware upgradeable via serial port

General

Temperature -30 to 150 degF / -35 to 65 degC
Humidity 99% non-condensing
Power Supply 9 – 30VDC
Current average 240mA (12VDC), 150mA (24VDC)
Case, heavy duty painted aluminum, DIN rail mounting
Size 4.5 x 5.5 x 1.2 in. / 114 x 140 x 30 mm
Weight < 1 lb / 0.5 kg
Indicators: Power/OK, Radio Rx and Tx, Radio Link, LAN Link/Activity, Serial Activity, Digital I/O
Approvals FCC Part 15.247, CE ETS 300 328, RSS 210
Hazardous area CSA Class 1 Div 2, IEC 60950 (pending)

Ordering Details

240U-E-100 100mW RF Power
240U-E-300 300mW RF Power



0508

Industrial Wireless

ELPRO 455U

High Performance Modem

Performance, integrity, security
Powerful, flexible, easy to use

Licensed and license-free radio channels,
380 – 512 MHz, 10mW – 5W, 12.5/20/25 KHz

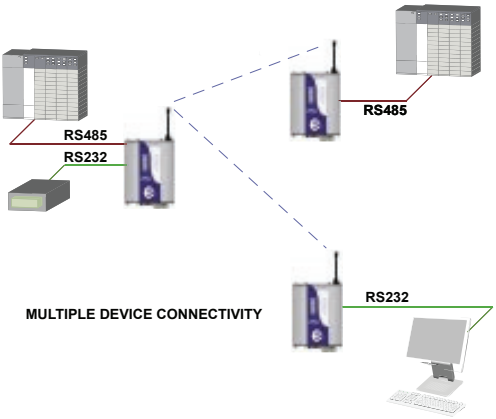
Three serial ports - two RS232 and one RS485,
two data ports and one configuration port
available with audio 600 ohm input for external modems

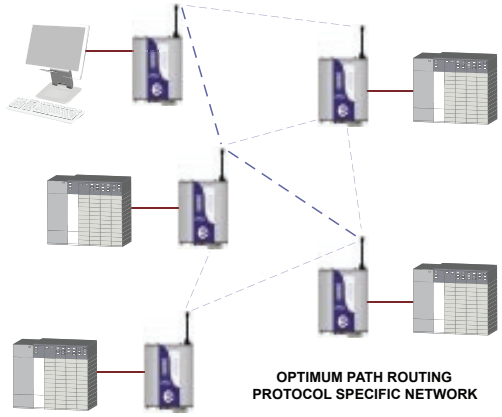
Connect to two serial devices using **MDC technology…**
Multiple Device Connectivity - two independent
configurable serial ports

Wireless data rate up to 19.2 Kb/s

Diagnostics and Configuration via dedicated RS232 port
Remote configuration and diagnostics to all units via the
wireless channel

Military-grade security encryption - 128 bit AES





Mesh Repeater networking – each unit can act as a repeater **and** connect to serial devices

Multiple operating modes

OPR Functionality … Protocol sensitive mode with Optimum Path Routing for Modbus, DF1 and DNP3 networks - maximum network communications efficiency

Broadcast "multidrop" mode

Addressed "dial-up" or fixed connection mode

On-line and remote modem control via AT commands

Hot-redundant standby functionality

Backup battery charging functionality with smart power monitoring and low power sleep mode

0508

Specifications

Different Models
455U-D High performance data modem
455U-A Data radio, audio input
455U-B Modem with Bell 202 or V23 (limited functionality)
455U-C Compatible with ELPRO 405U modem (limited functionality)

Standards Compliance
EN 300 113, EN 300 220, EN 300 086, EN 301 489-5
FCC Part 90, Part 15, RSS-119, AS4295, AS4768.1

General Specifications
Size: 140mm x 114mm x 30mm / 5.5in x 4.5in x 1.2in
Weight: 0.4 kg / 1 lb
DIN rail mounting, Painted aluminum housing
Temperature Range: -30°C to +60°C / -22 to +140°F
Humidity: 0 to 99% non-condensing
Supply Voltage: 11 to 30VDC
Battery Charger: Float charge voltage 13.8VDC with current limit set to 1.6A (minimum supply voltage 15V)
Low power sleep mode configurable using DTR control
Current @ 13.5VDC: quiescent 110mA; transmit 450mA (<0.5W), 800mA (1W), 1.25A (2W), 2A (5W)
Hazardous rating: Class 1 Div 2 (USA/Canada) pending

Serial Port (455U-D,B,C)
Data: 1 x RS232 (1.2 to 115.2 Kb/s) and 1 x RS485 (1.2 to 187.5 Kb/s)
Configuration: second RS232 port for configuration/diagnostics
7/8 data bits, 1/2 stop bits, odd/even/no parity

External Modem Option (455U-A only)
600 ohm audio input with level adjustment, PTT control, signal indication or audio mute output, received signal strength output as a voltage, enable/disable received audio muting with mute activation point adjustment
Configurable CTCSS sub-audible tone encoding

Radio Specifications
380 – 512 MHz radio transceiver, half-duplex or simplex operation
455U-D up to 9.6/19.2 Kb/s wireless data (12.5/25 KHz channels) Data modulation DFSK, GMSK, 4-level FSK
455U-B V23, Bell202 up to 1200 b/s with configurable CTCSS sub-audible tone encoding
Frequency configurable within 20 MHz band in 5/6.25 KHz steps
Configurable transmitter power 10 to 500mW, 0.5 to 5W
Frequency tolerance: +/-1.5ppm over temperature range
Duty cycle: 50%, 30 second maximum transmission time, also limited by configurable timeout and internal thermal shutdown protection
Data modulation DFSK, GMSK, 4-level FSK
Receiver sensitivity: –112dBm @ 10E-3 BER
–120dBm @ 12dB SINAD
Lightening protection: Internal gas discharge arrester

Digital Input/Output
One I/O channel
Input voltage-free contact / Output FET 30VDC 500mA
DI can be transmitted to remote DO
Also used for alarm output, or powering up local devices, or hot-redundant standby control.

Operating Functions for 455U-D

Configuration/Diagnostics
Configuration via AT commands or dedicated Windows Configuration package
Configuration and diagnostics access to remote units via wireless channel, both on-line and off-line
Diagnostic information can be accessed by dedicated Windows package or on-line by a host serial device
RSSI and noise signal measurement in dBm
Supply voltage, battery voltage, internal temperature, antenna fault status

Multiple Device Connectivity (MDC)
Two independent wireless links managed simultaneously - two serial devices can be connected to each unit (RS232 & RS485).

Security
128-bit AES encryption of wireless data can be enabled
Uses a 16-byte encryption key combined with a random 16-byte initialization vector unique to each message
Remote configuration/diagnostics password protected.

Operating Modes
Broadcast mode - wireless “multi-drop”
Addressed mode - acknowledged or un-acknowledged
Optimum Path Routing (OPR) mode - protocol specific modes for Modbus, DF1, DNP3 and Profibus - ensures optimum wireless message routing for fastest system response in busy networks

Store& forward Repeater
Each unit can act as a repeater and modem
Multiple repeater functionality can be configured in each operating mode using routing tables

Hot-redundant Standby
Two units connected together in a hot-redundant standby configuration
Changeover triggered by radio or serial communication delay timeout, CPU watchdog, low supply voltage, antenna fault

Model Details
455U - *Type - Power - Band - Channel*

Type	**D**	Data modem, full functionality		
	B	Data modem, Bell 202 or V23 messaging		
	A	External modem, 600 ohm audio input		
	C	Data modem compatible with ELPRO 405U		
Power	**L**	10 – 500mW	**H**	0.5 - 5W
Band	**390**	380 – 400 MHz	**410**	400 – 420 MHz
	430	420 – 440 MHz	**440**	430 – 450 MHz
	460	450 – 470 MHz	**480**	470 – 490 MHz
	500	490 – 512 MHz		
Channel	**N**	12.5 KHz	**W**	25KHz

0508

the wireless highspeed industrial radio modem

features

- Radio data rate up to 76 800 bits/sec
- RS232 / RS485 up to 115 200 bits/sec
- Licence-free 868MHz radio band
- Single hop distance 5 km line-of-sight
- Repeater function for longer distances, unlimited repeater hops
- Forward error correction, CRC error checking with ARQ
- Turn-around time 5 msec
- Radio signal strength and BER indication
- Configurable on-line by Hayes AT commands or Windows configuration software
- Transparent broadcast mode, peer to peer
- Addressed mode, multipoint and point-to-point
- Low power mode with DTR control
- On-line “dial-up” control using AT commands
- Repeater functionality in all units
- Repeater routing via address selection
- Security against cross-talk between systems

The ELPRO 805U radio modem provides RS232 or RS485 connections by radio. It is a low cost wireless alternative for linking PLC’s, data loggers, supervisory computers and intelligent transducers.

The 805U has been designed to be easy to use and simple to install. It uses a low power 868MHz radio which does not require a radio licence in most European countries. The module is fully integrated with radio, power supply, serial ports and microprocessor controller housed in a strong industrial aluminium case.

0508

Power Supply

- 10 - 30 VDC or 10 - 24 VAC supply
- Normal current drain 70mA/12VDC or 50mA/24VDC
- Current when transmitting 350mA/12V or 250mA/ 24V
- Low power mode current drain 20mA/12VDC or 15mA/24VDC

General

- Environmental -40 to 60 degC, 0 to 99 %RH
- EMC Compliant ETS 300 683
- Housing, extruded aluminium case 114 x 185 x 30 mm DIN rail mounting, removable terminal blocks for ease of module replacement, terminals suitable for 2.5sqmm conductors.
- LED indication for unit OK, radio TX and RX, serial TX and RX, DCD (comms OK).

Serial Port

- Standard data rates 1200 to 115200 baud.
- RS232 and RS485 standard interface connections provided, each connected to the same serial port. Serial interfaces are asynchronous non-return-zero (NRZ) format.
- Characters supported 7 or 8 data bits, even/odd/no parity, 1 or 2 stop bits
- RS232 connection provides full duplex operation as a DCE device with RTS/CTS hardware handshaking- standard D9 connector.
- RS485 connection provides half duplex operation for twisted-pair multidrop networks.
- Input and output buffers 2Kbyte

Radio Transceiver

- Single channel, synthesised transceiver
- Frequency 869.4 - 869.65 MHz, 250KHz channel
- Transmit Power 500mW
- RSSI -60 to -120 dBm
- Expected line-of-sight range, 5 km at 19200 bits/sec
- RF Data Transmission Rate - 19200 baud, 38400 baud, 76800 baud
- Range may be extended by:-
  - up to five intermediate repeaters for controlled mode
  - inlimited repeaters for transparent mode
- Conforms to EN 300 220
- Antenna connection is SMA coaxial

Data Transmission

- Transparent mode: Data is transmitted with a system and group address. Data transmission begins as serial data is received – maximum packet size is 530 bytes. All modules, with correct system address, which receive the data packets, outputs the data - error checking is optional.
- Controlled mode: Data is transmitted in packets with a system address, source address, destination address, up to five intermediate repeater addresses, and a 16 bit CRC error check. If the packet is received with a correct error check, only the destination module will output the data and will also return an ACK transmission.
  If the source module does not receive the ACK, it will retry a further four times. DCD provides communications status.
- Auto-connect and dial-up-control modes are available.
- CTS/RTS flow control provided based on input buffer availability.

Configuration and Diagnostics

- Configuration by freeware software package or by Hayes AT commands. Radio noise, signal strength and bit error rate (BER) diagnostics included. Radio signal strength value available on-line to host device.

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ELPRO 805U-E

Ethernet connectivity without the wiring

The 805U-E is an ideal solution for Ethernet connections in process control and automation applications - PLC's, DCS, SCADA, data acquisition … the 805U-E can handle multiple applications simultaneously.

All in the same unit ...

Maximum flexibility, while saving expensive wiring costs. Each module can be configured as a

- ☑ Access Point
- ☑ Bridge
- ☑ Repeater
- ☑ Client/Station
- ☑ Router

- 10/100 BaseT Ethernet, wireless data up to 77 Kbits/sec
- *ELPRO's* proven Industrial Strength 869MHz 500mW radio technology

Long and short range applications ...

- range 5km, license-free - repeater functionality increases wireless range even further
- excellent penetration in congested industrial environments - over 500 metres through buildings, factory walls and steelwork.

Security, reliability, redundancy ...

- multiple layers of error-detection and correction
- automatic changeover of Access Point if the wireless link fails
- military-grade AES security encryption of wireless data
- 802.1d Spanning Tree functionality

Firewall protection and efficient wireless management ...

- secure Firewall protection
- message filtering at MAC address level

Serial server interfaces ...

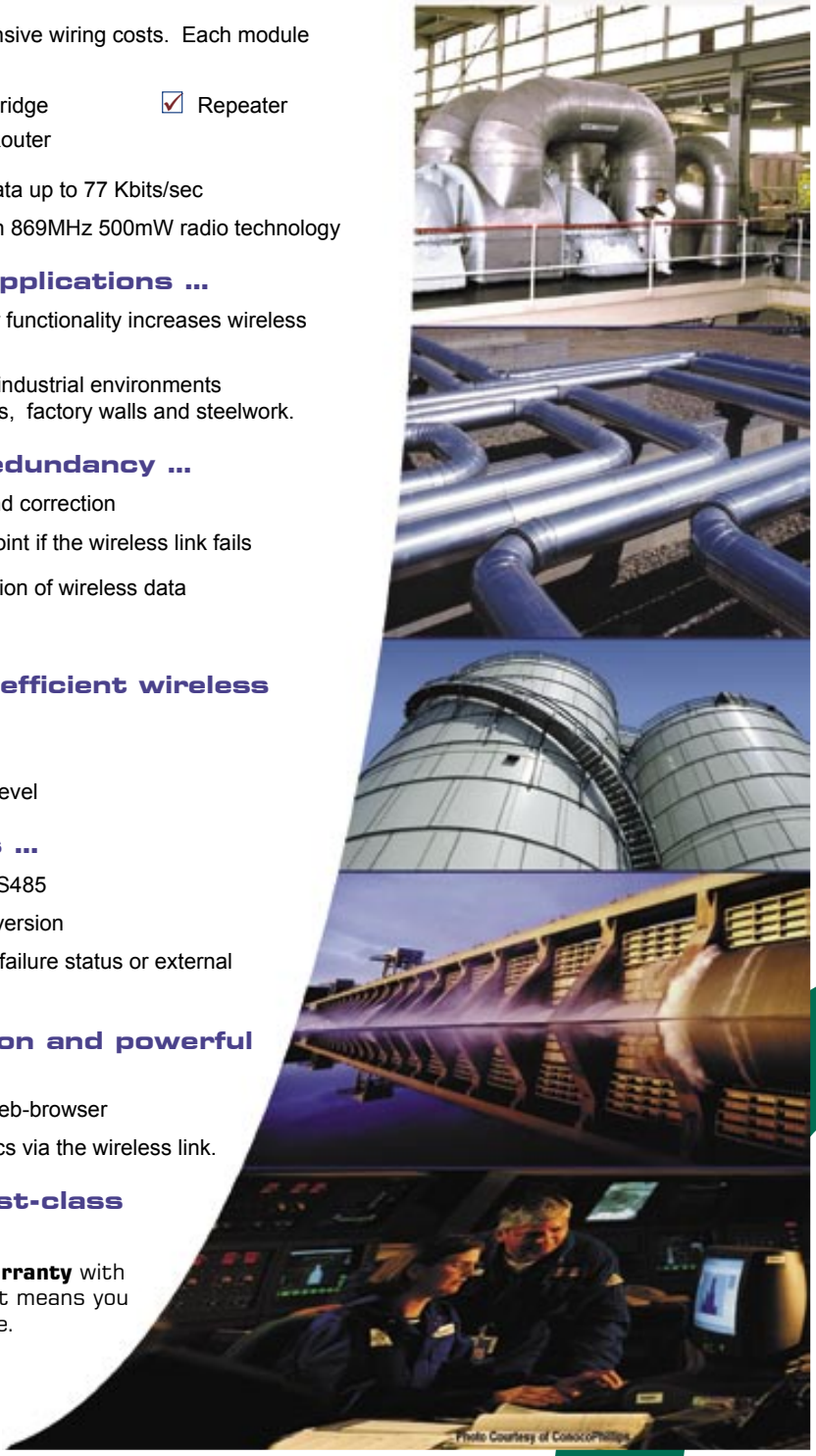
- two serial interfaces, RS232 and RS485
- Modbus serial to Modbus TCP conversion
- discrete channel for status I/O, for failure status or external status transfer.

Easy to use configuration and powerful diagnostics ...

- configuration and diagnostics via web-browser
- remote configuration and diagnostics via the wireless link.

Lifetime Warranty & first-class technical support

ELPRO's industry-first **Lifetime Warranty** with 24 hour telephone technical support means you can use the 805U-E with confidence.



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Specifications

Ethernet

10/100 BaseT RJ45
IEEE 802.3 compliant.
Bridge/router functions work with all Ethernet protocols
Embedded Protocols:
TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET

Serial

RS232 V.24 DCE 1.2 to 38.4 Kb/s
RS485 1.2 to 38.4 Kb/s
Serial server functionality, Modbus RTU to Modbus TCP conversion

Discrete I/O

One I/O channel
Input voltage-free contact / Output FET 30VDC 500mA

Networking

Configurable as Access Point or Client, Bridge or Router
Point-to-point, Point-to-multipoint, user configurable addressing
Repeater functionality MAC Filtering - whitelist or blacklist
Serial gateway TELNET Spanning Tree 802.1d

Radio

Single channel, synthesised transceiver
Frequency band 869.525 MHz 500 mW
Receiver sensitivity -108 dBm @ 10-6 BER
Data rates 7.2, 14.4, 38.4, 76.8 Kb/s or auto rate selection
Protocol CSMA/CA with 32 bit CRC and auto-correction
Radio range 5 km line-of-sight
Range may be extended using repeater features
SMA coaxial antenna connection

Security

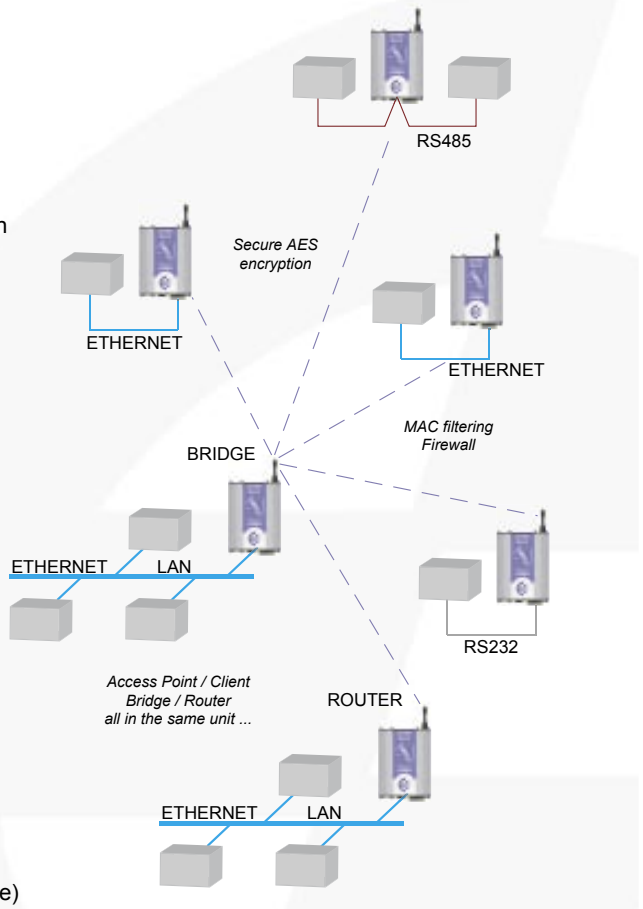
128 bit AES encryption or 64 bit proprietary encryption (configurable)
Data modulation keying MAC Address filtering
Password protected configuration

On-line Configuration and Diagnostics

HTTP with remote configuration via wireless link
RF signal strength, Bit Error Rate, connection monitoring and statistics
PPP Protocol Access to diagnostics

General

Temperature -40 to +60 degC
Humidity 99% non-condensing
Power Supply 10 – 30VDC
Current Normal 280mA (12V), 150mA (24V)
Transmit 500mA (12V), 300mA (24V)
Case, heavy duty painted aluminum, DIN rail mounting
Size 4.5 x 5.5 x 1.2 in. / 114 x 140 x 30 mm
Weight < 0.8 lb / 0.4 kg
Indicators: Power/OK, Radio Rx and Tx, Radio Link, LAN Link/Activity,
Serial Activity, Digital I/O, LAN 10/100Mbit Link
Approvals EN 300 220, EN 301 489



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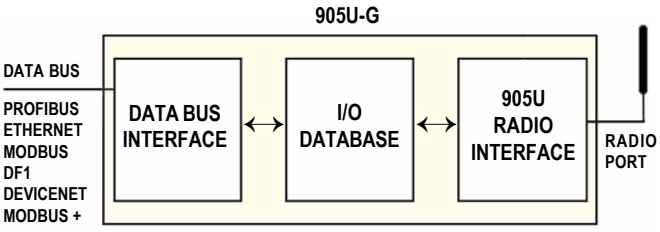
905U-G Wireless Gateway

Wireless connectivity between different data buses - Profibus, Ethernet, Modbus, DF1, DeviceNet, Modbus Plus

Interface between Wireless I/O and DCS/PLC/HMI

Wireless isolation firewall for data bus extension

The 905U-G Wireless gateway products provide a wireless interface between various data buses used in process and automation applications. The 905U-G includes an integral 900MHz license-free radio transceiver, and transfers transducer and control signals (I/O) using a highly secure and highly reliable radio protocol.



The 905U radio protocol is designed for very efficient radio usage, with configurable communications based on event reporting (I/O change), update times and/or poll response. Other features are:

high security data encryption
automatic acknowledgment and error-correction,
peer to peer addressing, and
mulitple path routing

Applications include:

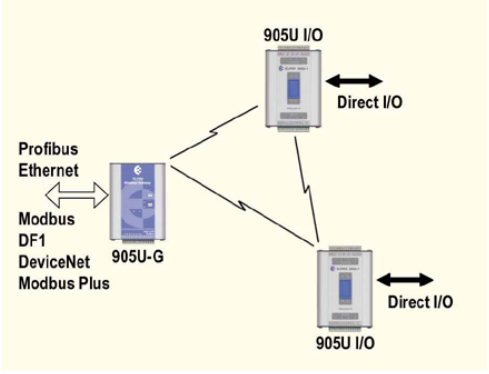
- The 905U-G interfaces between 905U wireless I/O and various data buses. Connect wireless I/O to PLC's, DCS, SCADA or Internet.
- Wireless extension of factory automation buses such as Profibus and Ethernet, providing a high security firewall.
- Wireless interconnectivity between different data buses - Ethernet to Profibus to Modbus to DF1.
- Combined networks of the above, forming an Elpro WIB ("Wireless Instrumentation Backbone").

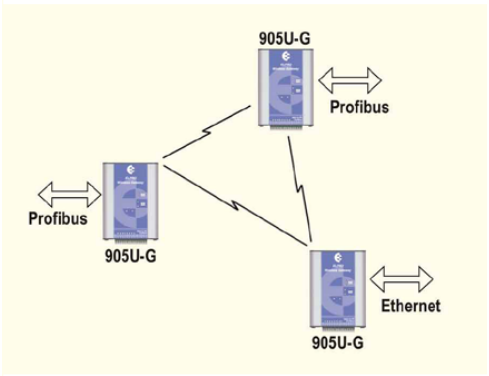
The 905U-G modules also have eight on-board discrete I/O, individually configurable as input or output.

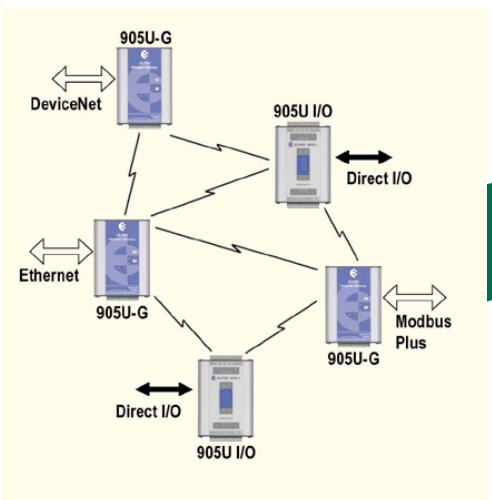
Network configuration is performed with easy-to-use free software. I/O links are configured between different modules in the network.

Ordering information:

905U-G-MD1	Modbus Master, Modbus Slave, DF1 interface
905U-G-PR1	Profibus DP Slave interface
905U-G-PR2	Profibus DP Master interface
905U-G-ET1	Ethernet IP / Modbus TCP / HTTP-FTP-Email
905U-G-DE1	DeviceNet Slave interface
905U-G-M+1	Modbus Plus Slave interface







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Specifications

Power Supply

9 – 30VDC / 12 – 24VAC
Battery charging circuit included for 12V back-up battery, max charge current regulated to 0.7A (>12V supply)
Normal current drain
MD1 version 12V 150mA; 24V 90mA
Other version 12V 270mA; 24V 170mA
Add 5mA per active I/O
Current drain during radio transmission - add to above
12V 350mA; 24V 200mA

General

Modbus/DF1 version
-40 to 140 degF (-40 to 60 degC),0 - 99 %RH
Profibus / Ethernet/ DeviceNet / Modbus Plus
30 to 140 degF (0 to 60 degC), 0 - 95 %RH
EMC Compliant EN55022, EN50082-1, FCC Part 15
Housing - extruded aluminum case 5.1 x 7.3 x 2.4 inches (130 x 185 x 60 mm), DIN rail mounting, removable terminal blocks for ease of module replacement, terminals suitable for 12 gauge (2.5sqmm) wire
LED indication for processor OK, radio TX and RX, serial TX and RX, active status.

I/O Capacity

Modbus / DF1 4300 I/O points (analog plus discrete)
Profibus Master, Ethernet, Modbus Plus
2048 bytes input and 2048 bytes output
up to 4300 discrete I/O points, or
up to 1024 analog in / 1024 analog out
Profibus Slave 416 I/O bytes
up to 1952 discrete inputs / 1952 discrete outputs, or
or up to122 analog in / 122 analog out
DeviceNet 512 bytes input and 512 bytes output
up to 4300 discrete I/O points, or
up to 256 analog in / 256 analog out
Register size 16 bit
Number of remote 905U addresses 500

Radio Transceiver

License-free frequency-hopping spread spectrum, 902-928MHz
Transmit power 1W
Approved to FCC Part 15.247, RS210
Line-of-sight range, subject to local conditions
USA/Canada, 4W ERP, 20+ miles
Australia/NZ, 1W ERP, 20+ km
Obstructed range thru buildings and congested plant or factory, typically 0.5 – 1.5 mile (1 – 2 km)
Range may be extended by up to four intermediate repeaters.
Data rate 19.2 Kbaud with FEC (raw rate 115.2 Kbaud)

Radio Transmission

Radio communications can be configured for combination of event reporting (change-of-value), update time, read/write blocks and poll response.
Radio message includes system addressing, unit addressing, error-checking and configurable security encryption.
Communication control includes message acknowledgments and up to four re-transmissions.
Peer to peer addressing. Messages may be routed thru four intermediate repeater addresses.
Fail-to-transmit and fail-to-receive alarms configurable

Modbus Specification

Modbus RTU (binary), master / slave configurable.
RS232 or RS485, 300 - 19200 bits/sec.

DF1 Specification

Allen-Bradley DF1 full-duplex.
RS232 only, 300 - 19200 bits/sec.

Profibus

Profibus-DP functionality according to EN 50170.
RS-485 optically isolated with on-board DC/DC converter, automatic baudrate detection (9600 bit/s - 12 Mbit/s)

Ethernet

10/100 Mbit/s, RJ45 connector, Transformer isolated interface
Modbus/TCP class 0, class 1 and partially class 2 slave
EtherNet/IP level 2 I/O Server
Embedded Web system (Dynamic HTTP), on-board file system (1.4MB flash disc), user downloadable web pages through FTP server, Email functionality (SMTP)

DeviceNet

DeviceNet 2.0 Slave, optically isolated RS422 with selectable baudrate between 125, 250 and 500 Kbit/sec.

Modbus Plus

Modbus Plus Slave, optically isolated RS485 with standard baudrate of 1 Mbit/sec, global data base transactions with routing for up to six networks.

On-board I/O

Eight discrete I/O, individually configurable as input or output. Inputs suitable for voltage free contacts.
Outputs are FET, 30VDC 500mA.

Configuration & Diagnostics

Configuration via free Windows software
Diagnostics include on-line read/write of I/O registers, radio signal strength values from remote units, and off-line testing of data bus protocol.

Area Classification

Class 1 Div 2 (USA, Canada).

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Wireless Profibus DP

ELPRO 905U-G-PR

Wireless Profibus DP interface, to 12Mbit/sec

Uses 900MHz license-free radio band

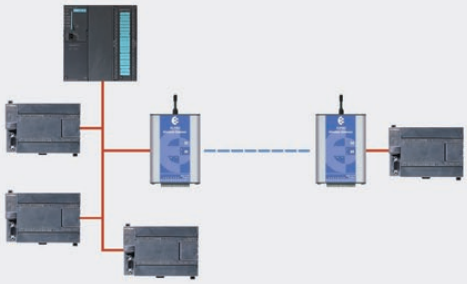
Up to 20 miles line-of-sight, 3000 feet in congested industrial environments

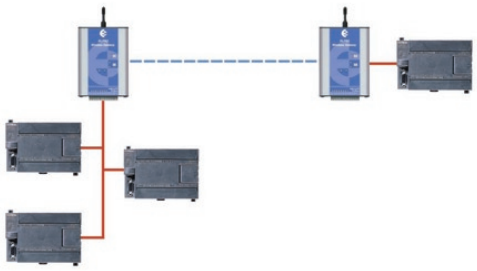
Also 450MHz 5W licensed radio, 30+ miles

Can act as a Profibus Slave to extend existing Profibus networks,

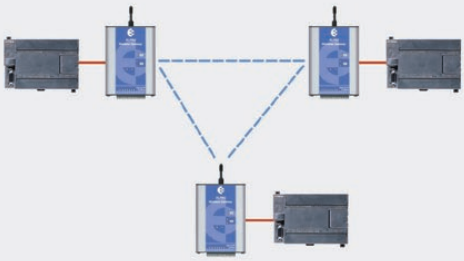
Provides secure Firewall isolation

Typical response time 30 msec (for transfer of 64 digital values)

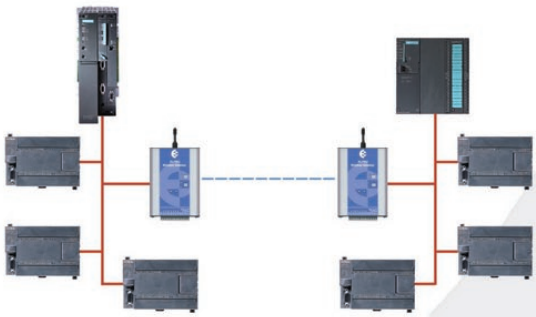




Wireless unit can also act as Profibus Master, connecting to up to 125 Profibus Slaves

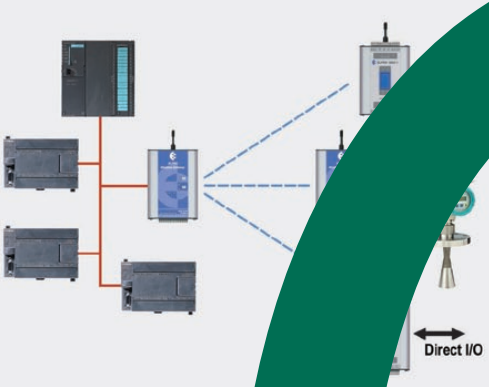


Up to 95 Wireless units can connect in a peer-to-peer network



Connect separate Profibus LAN's using a secure Firewall

Wireless transmissions protected by security encryption



Connect remote Profibus sensors and I/O

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www.elprotech.com

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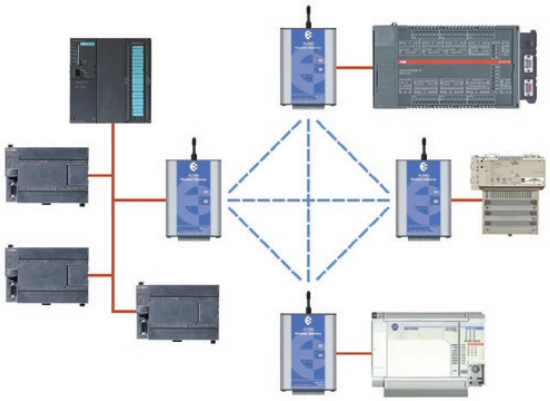
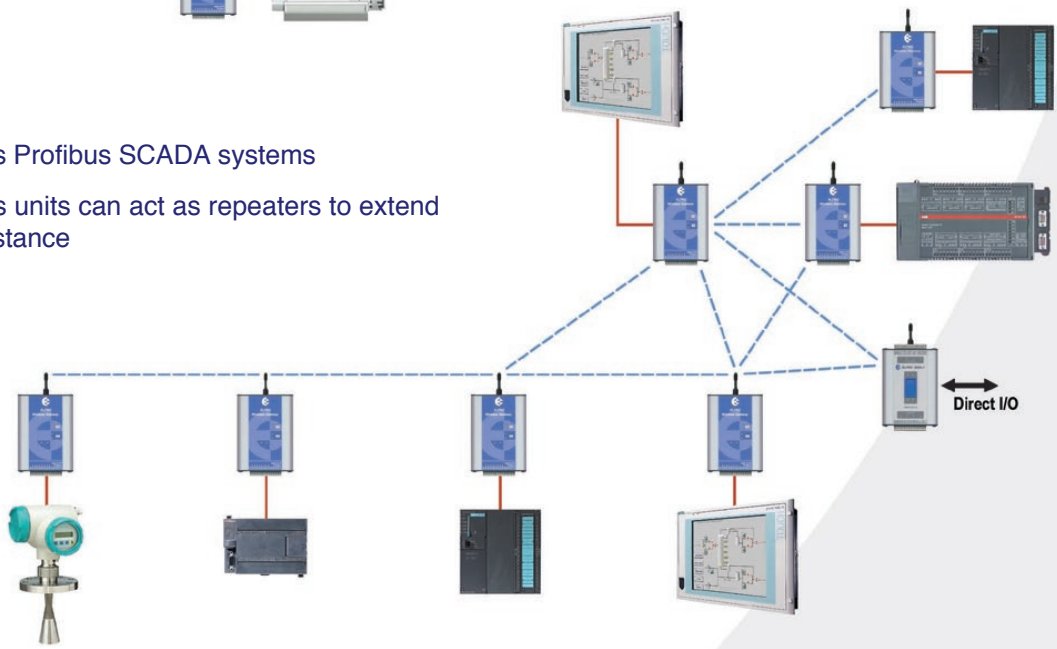
Wireless Profibus DP



Interconnect other data buses and PLC's

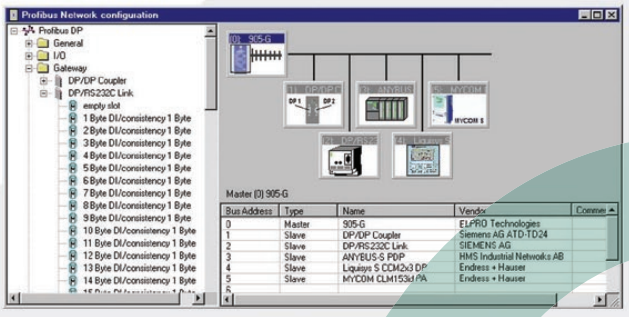
Wireless protocol conversion - connect to Modbus, DF1, EtherNet IP, Modbus TCP, DeviceNet, Modbus Plus

Internet enabled via internal 1.4 MB embedded web system (dynamic HTTP) with event activated email functionality



Wireless Profibus SCADA systems

Wireless units can act as repeaters to extend radio distance



Easy to use, drag and click configuration

Configuration and diagnostic software supplied at no additional cost

ELPRO Technologies Pty Ltd
9/12 Billabong St, Stafford, Qld, 4053 Australia
Telephone: +61 7 3352 4533 USA (866) 713 4409
Fax: +61 7 3352 4577
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Internet: www.elprotech.com

ELPRO Technologies
www.elprotech.com

WIB ready

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Industrial Wireless Ethernet

Plug & Work with ELPRO 905U-E

Ethernet connectivity without the wiring

The 905U-E is an ideal solution for Ethernet connections in process control and automation applications - PLC's, DCS, SCADA, data acquisition, wireless video … the 905U-E can handle multiple applications simultaneously.

All in the same unit ...

Maximum flexibility, while saving expensive wiring costs. Each module can be configured as a

- ☑ Access Point
- ☑ Client/Station
- ☑ Bridge
- ☑ Router

- 10/100 BaseT Ethernet, wireless data up to 200 Kbits/sec
- *ELPRO's* proven Industrial Strength 900MHz FHSS technology with high immunity to interference

Long and short range applications ...

- range 60 miles (100km), license-free - repeater functionality increases wireless range even further
- excellent penetration in congested industrial environments - over 3000 feet (1 km) through buildings, factory walls and steelwork.

Security, reliability, redundancy ...

- multiple layers of error-detection and correction
- automatic changeover to another Access Point if the wireless link fails
- military-grade AES security encryption of wireless data

Firewall protection and efficient wireless management ...

- secure Firewall protection
- message filtering at MAC address level

Serial interfaces ...

- two serial interfaces, RS232 and RS485
- discrete channel for status I/O, for failure status or external status transfer.

Easy to use configuration and powerful diagnostics ...

- configuration and diagnostics via web-browser
- remote configuration and diagnostics via the wireless link.

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Ethernet

10/100 BaseT RJ45
IEEE 802.3 compliant.
Bridge/router functions work with all Ethernet protocols
Embedded Protocols:
TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET

Serial

RS232 V.24 DCE 1.2 to 115.2 Kb/s
RS485 1.2 to 115.2 Kb/s

Discrete I/O

One I/O channel
Input voltage-free contact / Output FET 30VDC 500mA

Networking

Configurable as Access Point or Client, Bridge or Router
Point-to-point, Point-to-multipoint, user configurable addressing
Repeater functionality MAC Filtering - whitelist or blacklist
Serial gateway TELNET

Radio

Frequency hopping spread spectrum
Frequency bands

USA/Canada	902 - 928 MHz
Australia	915 - 928 MHz
New Zealand	921 - 928 MHz

For other countries, refer to ELPRO
Transmit power 0.1 – 1W (20 – 30 dBm) configurable
System gain 140 dB
Receiver sensitivity -108 dBm @ 10-6 BER
Data rates 19.2, 38.4, 100, 200 Kb/s or auto rate selection
Protocol CSMA/CA with 32 bit CRC and auto-correction
Radio range 60 miles / 100 km line-of-sight using high gain antennas and subject to local conditions (up to 4W ERP permitted in USA/Canada)
Range may be extended using repeater features
SMA coaxial antenna connection

Security

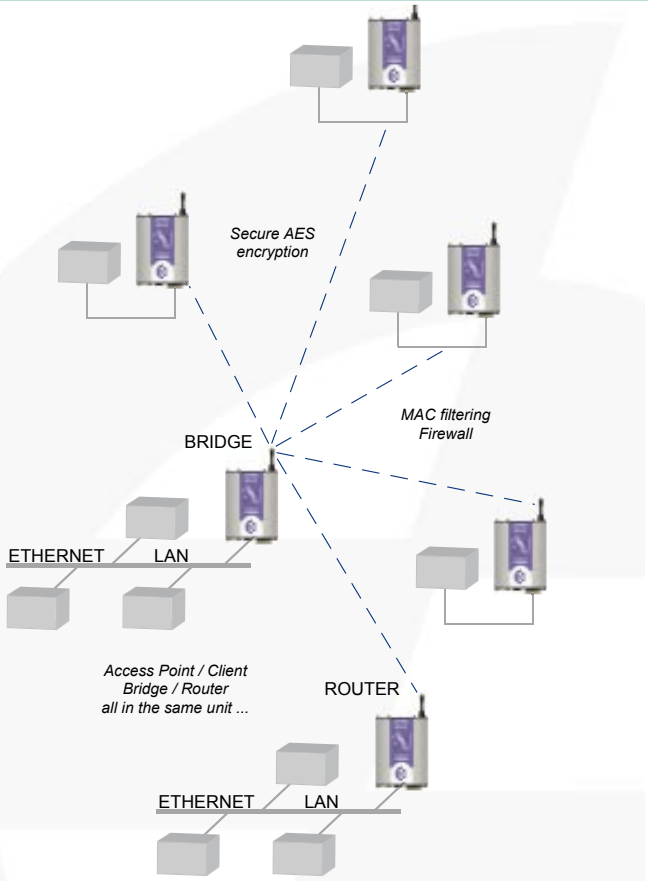
128 bit AES encryption or 64 bit proprietary encryption (configurable)
Data modulation keying MAC Address filtering
Password protected configuration

On-line Configuration and Diagnostics

HTTP with remote configuration via wireless link
RF signal strength, Bit Error Rate, connection monitoring and statistics
PPP Protocol Access to diagnostics

General

Temperature -40 to 140 degF, -40 to +60 degC
Humidity 99% non-condensing
Power Supply 10 – 30VDC
Current Normal 280mA (12V), 150mA (24V)
Transmit (1W) 500mA (12V), 300mA (24V)
Case, heavy duty painted aluminum, DIN rail mounting
Size 4.5 x 5.5 x 1.2 in. / 114 x 140 x 30 mm
Weight < 0.8 lb / 0.4 kg
Indicators: Power/OK, Radio Rx and Tx, Radio Link, LAN Link/Activity, Serial Activity, Digital I/O, LAN 10/100Mbit Link
Approvals FCC 15.247, RS210
Hazardous area CSA Class 1 Div 2 (pending)



ELPRO Technologies

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Email: sales
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bro_905e_1.0
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the wireless highspeed industrial radio modem

The ELPRO 905U-D radio modem provides RS232 or RS485 connections by radio. It is a low cost wireless alternative for linking PLC's, data loggers, supervisory computers and intelligent transducers.

The 905U-D has been designed to be easy to use and simple to install. It uses a 900MHz spread spectrum radio which does not require a radio license in many countries.

The module is fully integrated with radio, power supply, serial ports and microprocessor controller housed in a strong industrial aluminum case.

features

- Radio data rate up to 115 200 bits/sec
- RS232 and RS485
- License-free 900MHz frequency hopping
- Single hop distance to 20+ miles
- Repeater function for longer distances, unlimited repeater hops
- Forward error correction, CRC error checking with ARQ
- Turn-around time 5 msec
- Radio signal strength and BER indication
- Configurable on-line by Hayes AT commands or Windows configuration software
- Transparent broadcast mode, peer to peer
- Addressed mode, multipoint and point-to-point
- Fast point-to-point mode
- Low power mode with DTR control
- On-line "dial-up" control using AT commands
- Repeater functionality in all units
- Repeater routing via address selection
- Security against cross-talk between systems

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Power Supply

- 10 - 30 VDC or 10 - 24 VAC supply
- Normal current drain 70mA/12VDC or 50mA/24VDC
- Current when transmitting 350mA/12V or 250mA/ 24V
- Low power mode current drain 20mA/12VDC or 15mA/24VDC

General

- Environmental -40 to +140 degF (-40 to 70 degC)
- EMC Compliant FCC Part 15 Class A
- Housing, extruded aluminum case 4.5"x 7.3"x 1.2"(114 x 185 x 30mm) DIN rail mounting, removable terminal blocks for ease of module replacement, terminals suitable for 12 gauge (2.5sqmm) conductors.
- LED indication for unit OK, radio TX and RX, serial TX and RX, DCD (comms OK).

Serial Port

- Standard data rates 1200 to 115200 baud.
- RS232 and RS485 standard interface connections provided, each connected to the same serial port. Serial interfaces are asynchronous non-return-zero (NRZ) format.
- Characters supported 7 or 8 data bits, even/odd/no parity, 1 or 2 stop bits
- RS232 connection provides full duplex operation as a DCE device with RTS/CTS hardware handshaking- standard D9 connector.
- RS485 connection provides half duplex operation for twisted-pair multidrop networks.
- Input and output buffers 2Kbyte

Radio Transceiver

- Frequency Hopping Spread Spectrum Transceiver
- Frequency - USA/Canada 902 - 928 MHz
  - Australia 915 - 928 MHz
  - NZ 921 - 928MHz
- Hop Sequence - 16 x 50
- Transmit Power 1W
- RSSI –120 to -60 dBm
- Expected line-of-sight range, depending on local conditions
  - USA/Canada 20+ miles
  - Australia/NZ 20+ km
- RF Data Transmission Rate - 19200 baud, 57600 baud, 115200 baud (selectable)
- Range may be extended by: - up to five intermediate repeaters in controlled mode - unlimited repeaters in transparent mode
- Conforms to FCC Part 15 Class A and FCC Part 15.247
- Antenna connection is SMA coaxial

Data Transmission

- Transparent mode: Data is transmitted with a system and group address. Data transmission begins as serial data is received – maximum packet size is 530 bytes. All modules, with correct system address, which receive the data packets, outputs the data - error checking is optional.
- Controlled mode: Data is transmitted in packets with a system address, source address, destination address, up to five intermediate repeater addresses, and a 16 bit CRC error check. If the packet is received with a correct error check, only the destination module will output the data and will also return an ACK transmission. If the source module does not receive the ACK, it will retry a further four times. DCD provides communications status.
- Auto-connect and dial-up-control modes are available.
- CTS/RTS flow control provided based on input buffer availability.

Configuration and Diagnostics

- Configuration by freeware software package or by Hayes AT commands. Radio noise, signal strength and bit error rate (BER) diagnostics included. Radio signal strength value available on-line to host device.

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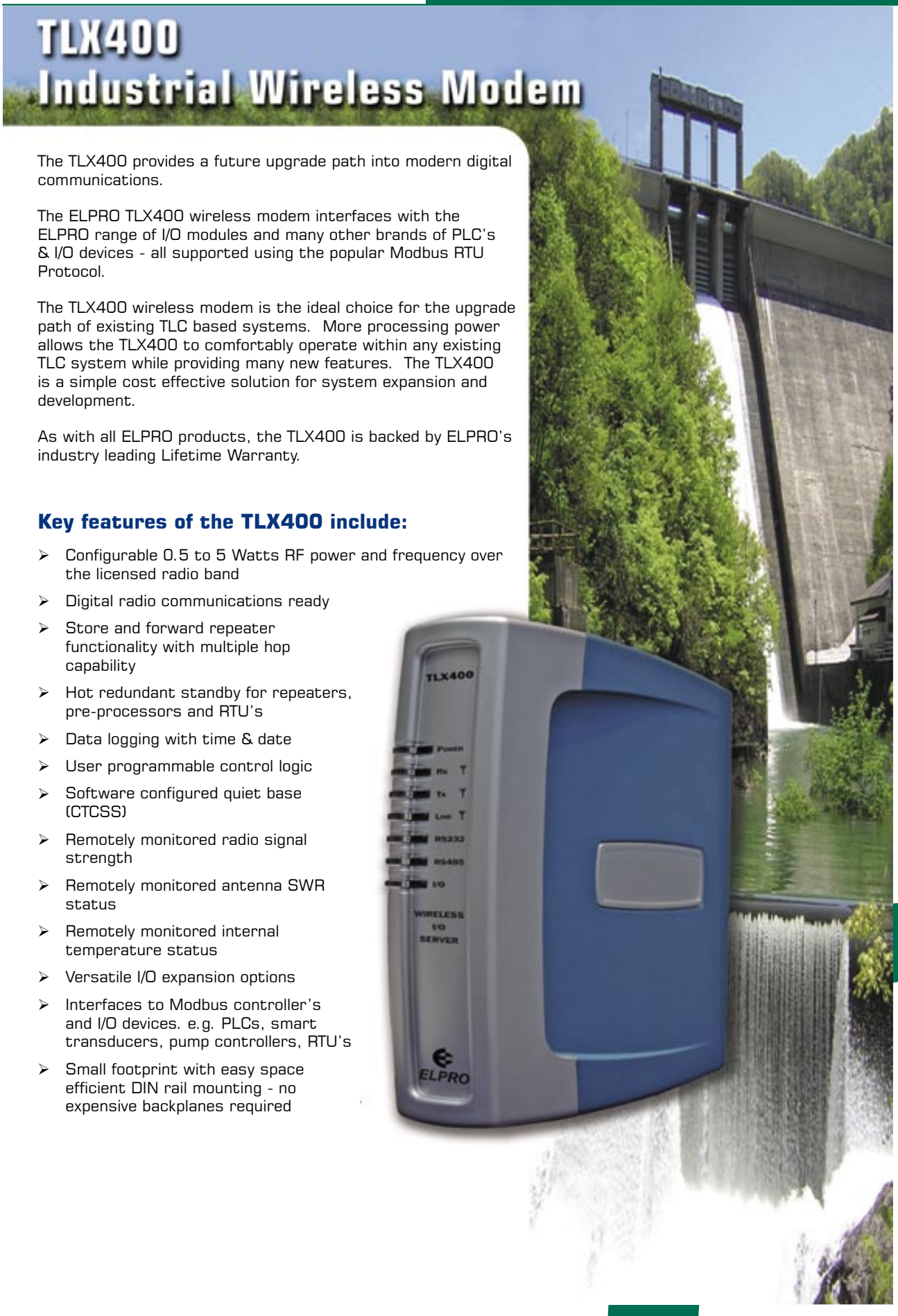
TLX400
Industrial Wireless Modem



The TLX400 provides a future upgrade path into modern digital communications.

The ELPRO TLX400 wireless modem interfaces with the ELPRO range of I/O modules and many other brands of PLC's & I/O devices - all supported using the popular Modbus RTU Protocol.

The TLX400 wireless modem is the ideal choice for the upgrade path of existing TLC based systems. More processing power allows the TLX400 to comfortably operate within any existing TLC system while providing many new features. The TLX400 is a simple cost effective solution for system expansion and development.

As with all ELPRO products, the TLX400 is backed by ELPRO's industry leading Lifetime Warranty.

Key features of the TLX400 include:

- Configurable 0.5 to 5 Watts RF power and frequency over the licensed radio band
- Digital radio communications ready
- Store and forward repeater functionality with multiple hop capability
- Hot redundant standby for repeaters, pre-processors and RTU's
- Data logging with time & date
- User programmable control logic
- Software configured quiet base (CTCSS)
- Remotely monitored radio signal strength
- Remotely monitored antenna SWR status
- Remotely monitored internal temperature status
- Versatile I/O expansion options
- Interfaces to Modbus controller's and I/O devices. e.g. PLCs, smart transducers, pump controllers, RTU's
- Small footprint with easy space efficient DIN rail mounting - no expensive backplanes required

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Specifications

General
Supply voltage: 10 to 30 VDC
Internal battery charger: 12V sealed lead acid battery
Voltage protection: Power supply over-voltage / short circuit protection
Temperature: -30° to 70°C
Humidity: Up to 99% non-condensing

Radio Transceiver
Frequency: 380 to 512 MHz
Receiver sensitivity: -118 dB @ 12 dB SINAD
RF power output: 0.5-5 Watt software adjustable
Duty cycle: Temperature and time limited
Lightning protection: Internal gas discharge suppresser

Compliance
Australia: C-Tick compliant, radio to AS4768.1, AS4295
USA: FCC Part 15, Part 90
Canada: RSS-119
Europe: CE, EN300-113-2, EN300-086-2

Housing
Case: ABS plastic - UL 94V-0
Dimensions: W 42mm, H 145mm, D 130mm
DIN rail mounting
Weight: 400 grams

Interface
Configuration: RS232 configuration port 9600 baud
Host devices: RS232 1200 to 115200 baud configurable
Expansion I/O: RS485 32-module I/O expansion or PLC.

Connectors
Power: Removable screw connectors
Radio port: SMA Female
Configuration port: RJ45
Host Port: DB9
Expansion: 2-wire screw terminal RS485

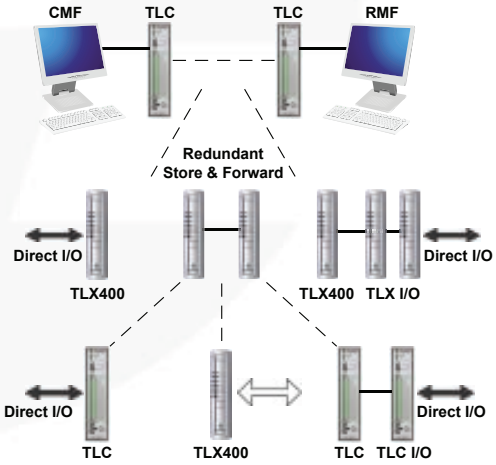
Digital I/O
Output: 500mA / 30 VDC max o/c transistor
Input: Voltage free contact closure

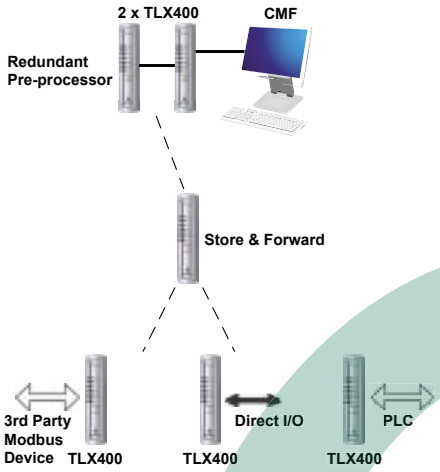
Data Logging
I/O Module data & user configurable alarm messages
128k Byte logging memory

Local Control
Programmable logic
C Programmable
Access to logging functions

I/O Expansion
Up to 32 I/O modules may be connected via the RS485 port. Supports third party Modbus devices or ELPRO I/O. Simplified I/O configuration with ELPRO I/O modules.

Solar Power Input
On board solar regulator
Recommended solar panel: Up to 40W, 15-30V (3A max)





0508

ELPRO Technologies Pty Ltd

Application Note: 105/905U-G-ET1 Modbus TCP & OPC Server

app_105/905U-G_ModbusTCP_1.2.doc

PURPOSE

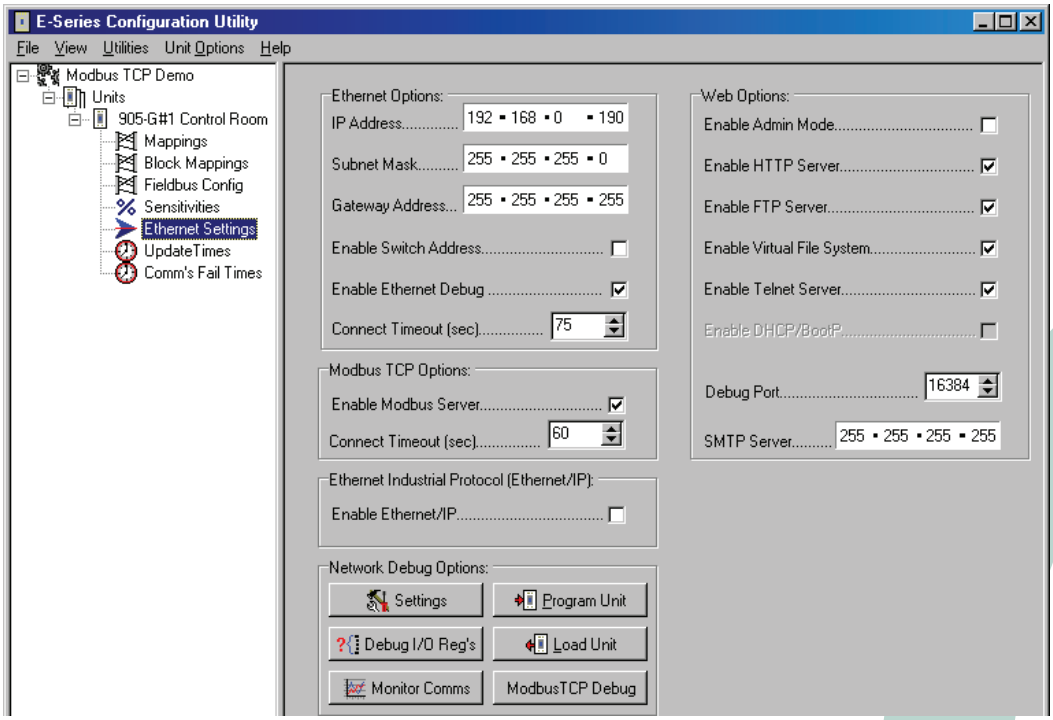
The purpose of this document is to provide the reader with an application note for setting up an OPCServer, (KEPServer Enterprise) communicating Modbus TCP with an Elpro 105/905U-G-ET1 gateway.
This application should be read in conjunction with user manuals for details on powering and programming 105/905U-G. The reader would also have a firm understanding of the Modbus TCP protocol and programming the KEPWares KEPServer OPC Server.

MATERIALS

Kepware KEPServer OPC Server Software,
105/905U-G-ET1,
E-Series Configuration utility,
RS232 DB9 serial cable,
RJ45 Ethernet cables and Network Hub (depending on connection crossover cables may be needed)

105/905U-G CONFIGURATION

Under Ethernet Settings the modules IP address needs to be set. If going through a network then this address will need to be entered also under Gateway address. Ensure the Enable Ethernet/IP checkbox has been Disabled and Enable Modbus Server has been enabled.



Application Note 105/905U-G-ET1 Modbus TCP
Issue 1.2 – Apr 2006

Note: This application note is using the Analog Inputs for testing the communications. When transferring Integer values such as for level, pressure and temp from field 105/905U-1,2,3,4 etc the values will always in the range of 16384 to 49152 for 4-20mA and 8192 to 49152 for 0-20mA.
A digital input is either On or Off and depending on the format you read it as in the Debug I/O screen i.e Hex, Decimal or Discrete you will see FFFF, 65535, 1 for ON & 0000, 0, 0 for OFF respectively.

Amendment Register:

Issue No.	Date	Details of Amendment
1.0	1-10-05	Draft Issue
1.1	6-12-05	Added CSV File Import/Export
1.2	18-04-06	Name Change for 105/905

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ELPRO Technologies Pty Ltd

Application Note: 105/905U-G-ET1 Modbus TCP & OPC Server

app_105/905U-G_ModbusTCP_1.2.doc

PURPOSE

The purpose of this document is to provide the reader with an application note for setting up an OPCServer, (KEPServer Enterprise) communicating Modbus TCP with an Elpro 105/905U-G-ET1 gateway.
This application should be read in conjunction with user manuals for details on powering and programming 105/905U-G. The reader would also have a firm understanding of the Modbus TCP protocol and programming the KEPWares KEPServer OPC Server.

MATERIALS

Kepware KEPServer OPC Server Software,
105/905U-G-ET1,
E-Series Configuration utility,
RS232 DB9 serial cable,
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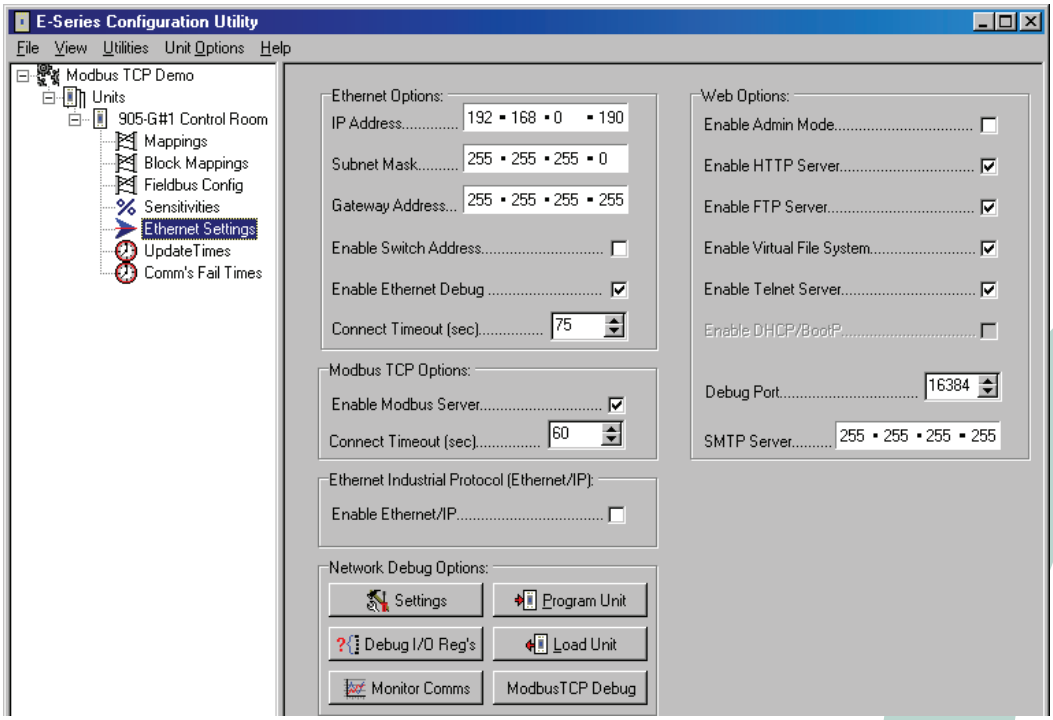
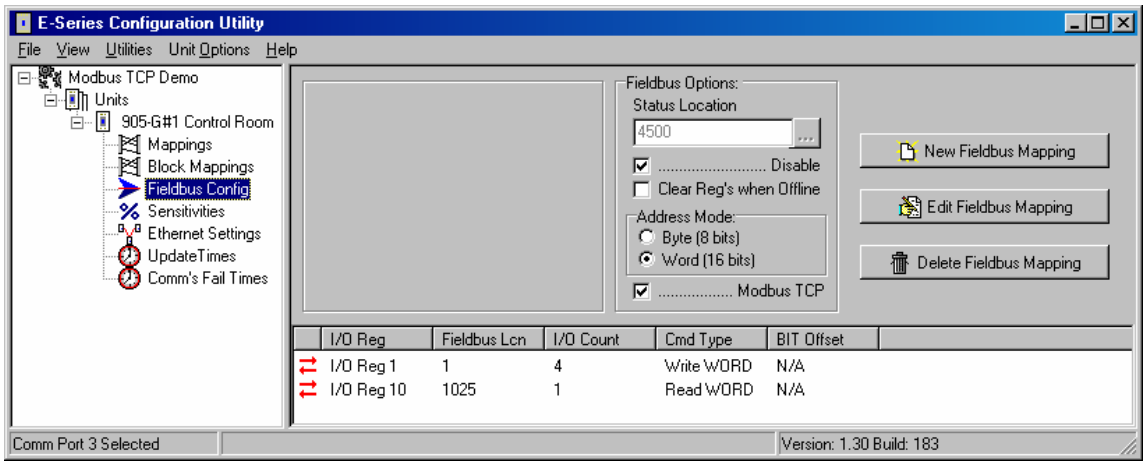
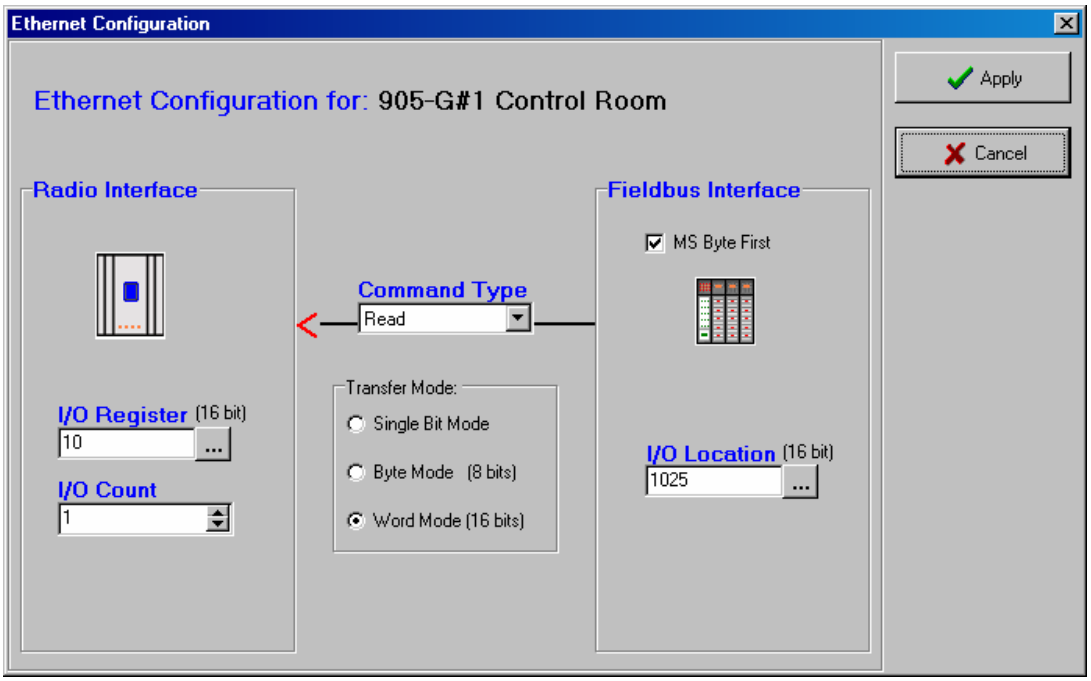
105/905U-G CONFIGURATION

Under Ethernet Settings the modules IP address needs to be set. If going through a network then this address will need to be entered also under Gateway address. Ensure the Enable Ethernet/IP checkbox has been Disabled and Enable Modbus Server has been enabled.



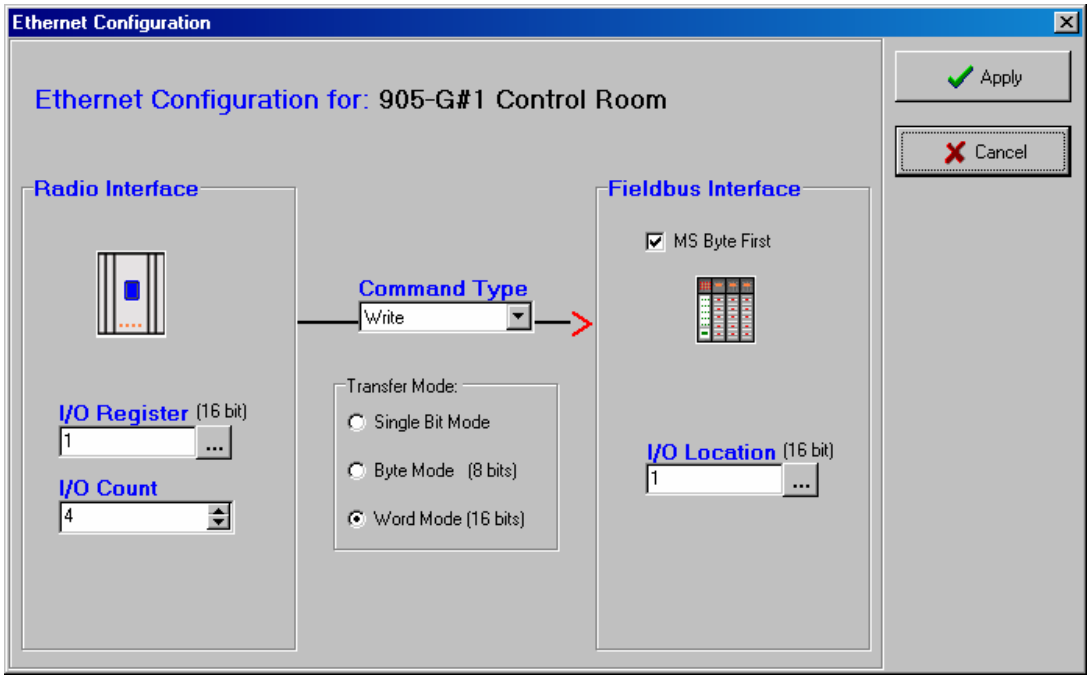
To exchange data between the 105/905U-G and an OPC Server a series of Fieldbus Configurations that link the I/O registers of the Gateway to the Fieldbus need to be made. In the example below Regs 1,2,3,4 are being written across to Fieldbus location 1,2,3,4. Also Fieldbus location 1025 is being read into Reg 10.





The above example shows a Command Type Read from the Fieldbus Interface to the Gateway. This will come from the OPC Server's output tags.

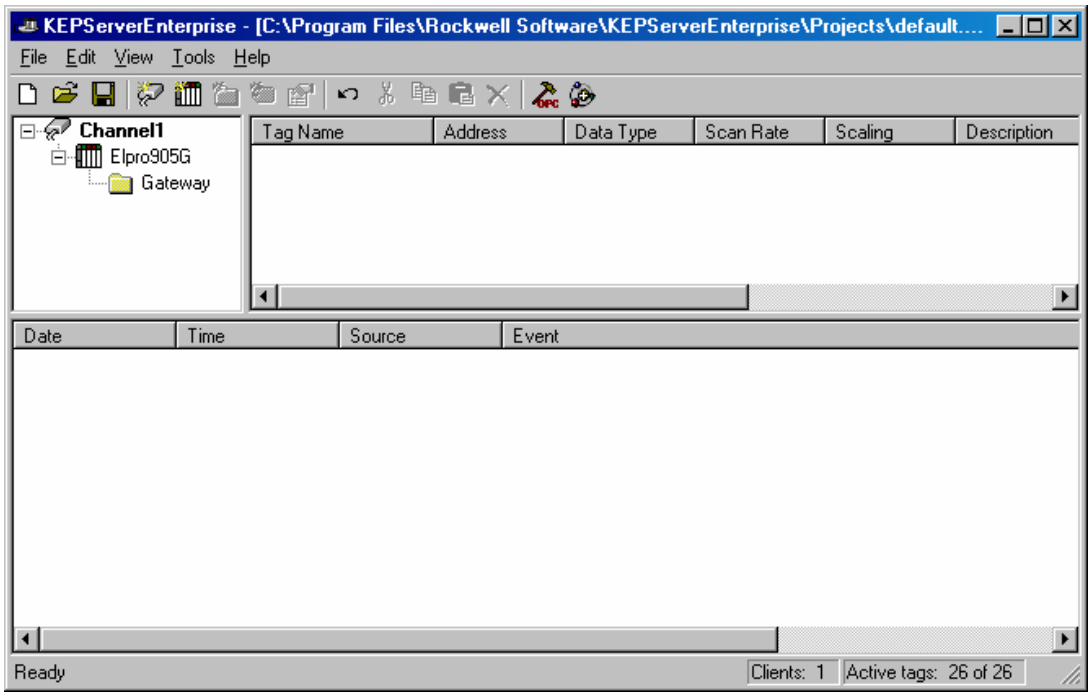
The next Command Type Write mapping below is to the Fieldbus Interface in which the OPC Server will read this value and store in its Input tags.



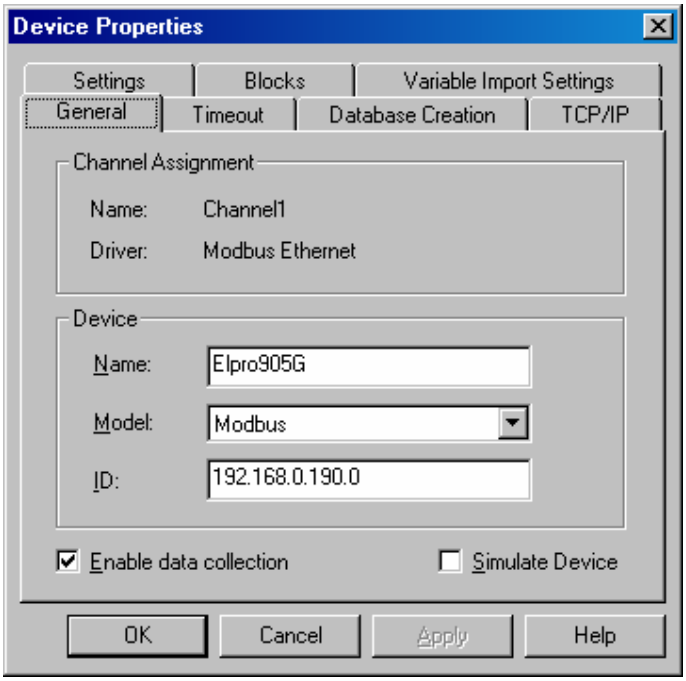
Once mappings are complete configuration will need to be downloaded to module via RS232 cable as per manual.

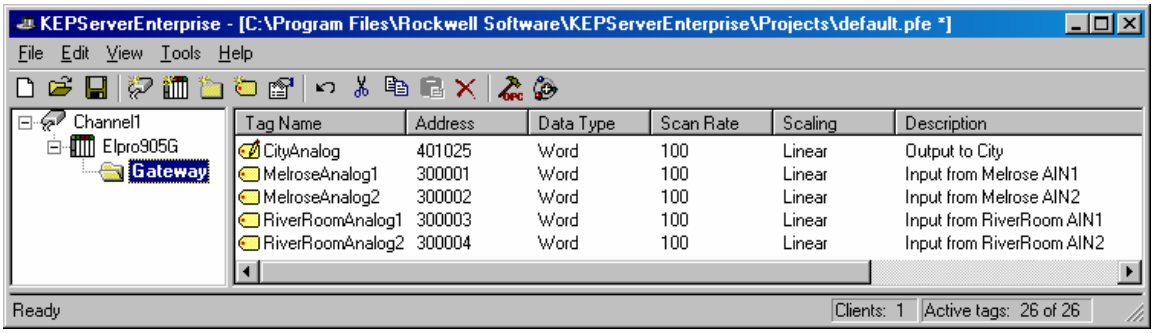
OPC SERVER CONFIGURATION

The OPC Server software now needs to be setup.



Create a new Channel and add the following
Name – Any name you want
Model – Select Modbus
IP address – Must be the same as the one configured in the 105/905U-G-ET1
Timeout times -Default. Connect timeout = 3, Request Timeout = 1000, Fail after = 3.
TCP/IP port - 502.

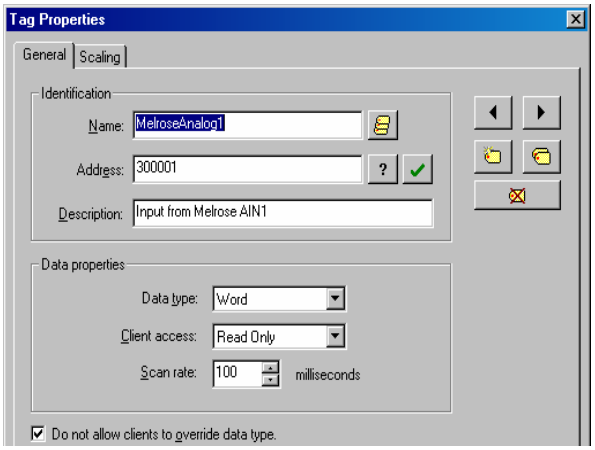




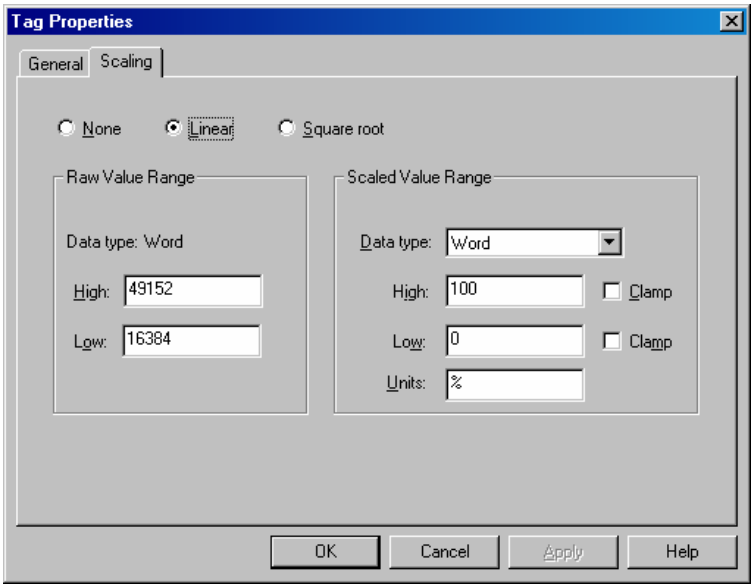
When this is done you can setup appropriate tags for the I/O.
In this example I have setup 4 Modbus Read Word Tags starting at Modbus address 30001 tags and 1 Modbus Write word Tag at address 41025.
The Modbus Command is made up of a Command and a Modbus Address.
Modbus commands are 0X = Write Bit, 1X = Read Bit, 3X = Read Word, 4X = Write Word
So 30001 will Read Word at Modbus location 1 or 41025 will Write Word to Modbus Location 1025.

For Further Information on addressing refer to ELPRO 105/905U-G Manual for Modbus TCP Addressing Ranges

Each Tag needs to have
Name – Tag name
Modbus address – Standard Modbus command & address i.e 1X, 3X, 4X or 0X
Description - Description of what the I/O is.
Data type – Select Word as all Gateway registers are 16 bit
Client Access – Read only for inputs or Read/Write for Outputs.
Scan Rate – Default 100 mSec.

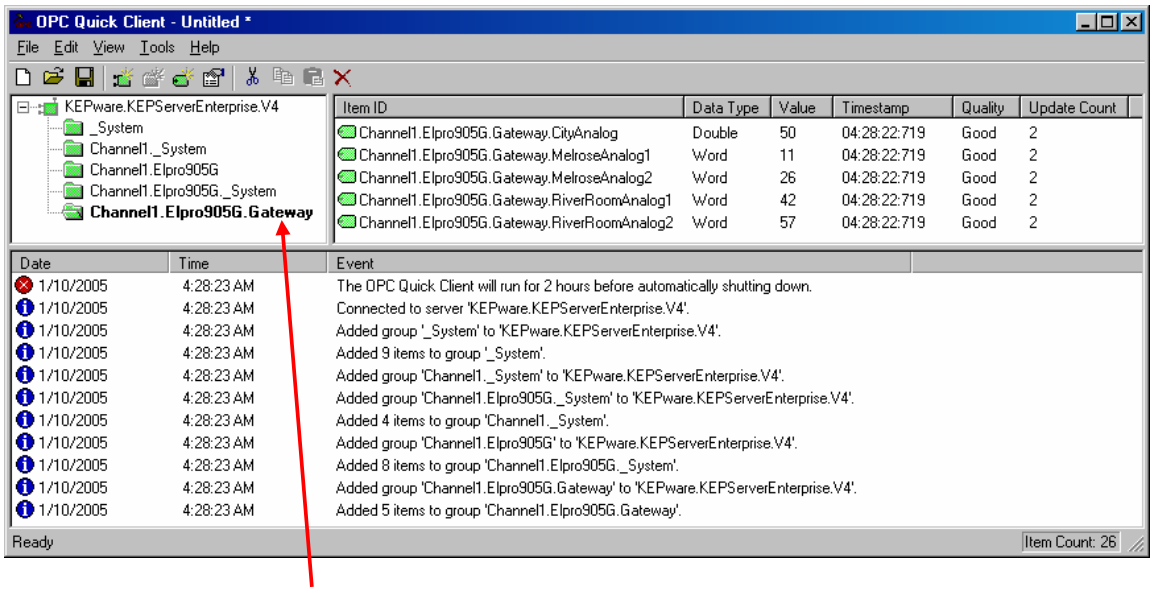


You can also setup Scaling on each of the Tags if you wish. 105/905U-G I/O registers are 16 bit (0 – 65535) and a typical range for an analog value from a field station is
4mA = 16384 decimal
20mA = 49152 decimal
This is shown here as being a linear scale of 0 to 100 % is equal to decimal value 16384 to 49152

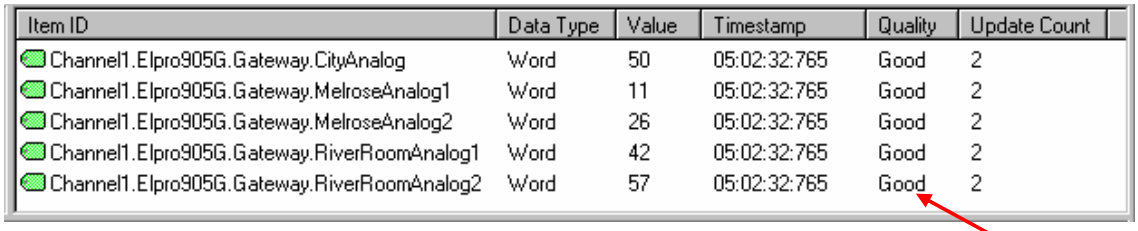


For Firmware versions 1.76 and above Scaling of the I/O registers can be applied in the E-series configuration software for all read and write commands.

When all tags have been setup select “Launch OPC Quick Client” from the Tools drop down Menu and this will launch the OPC Client. See below.



We can see it generate a number of default groups showing system status etc but the main one we are interested in is the **Channel1.Elpro105/905G.Gateway** group which shows all of the Tags we configured in the previous step.

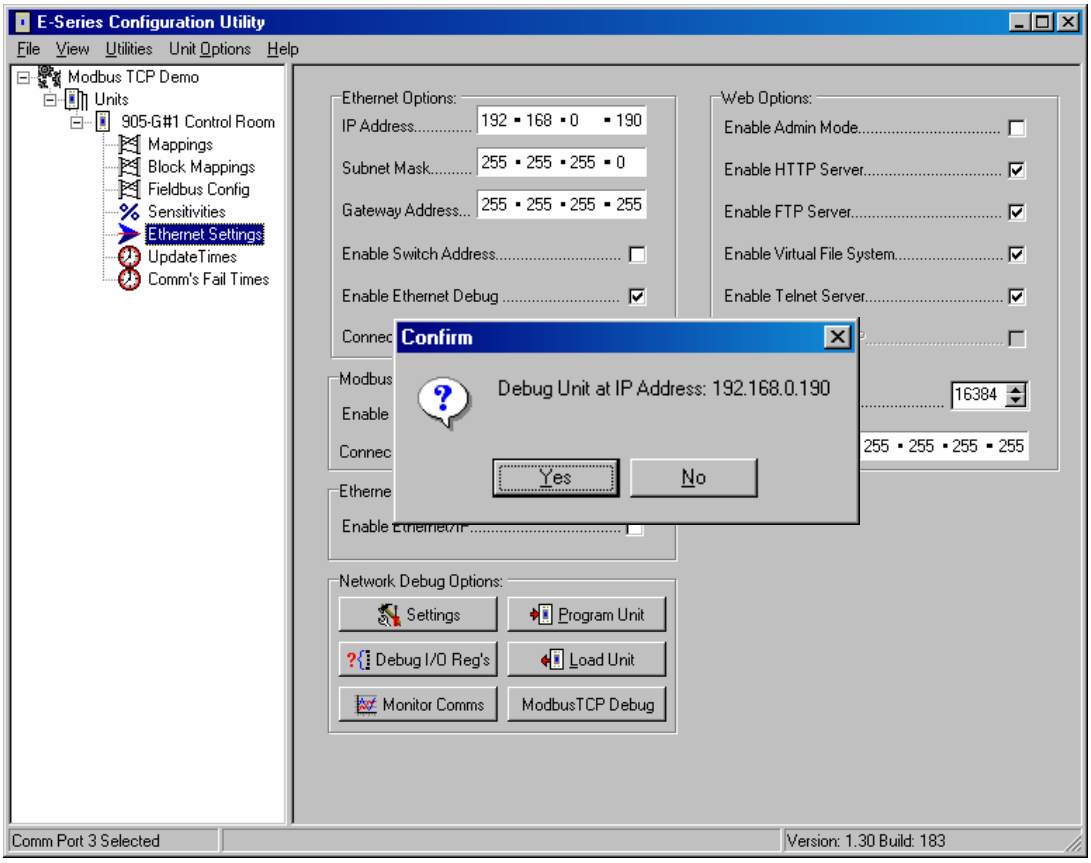


Item ID	Data Type	Value	Timestamp	Quality	Update Count
Channel1.Elpro905G.Gateway.CityAnalog	Word	50	05:02:32:765	Good	2
Channel1.Elpro905G.Gateway.MelroseAnalog1	Word	11	05:02:32:765	Good	2
Channel1.Elpro905G.Gateway.MelroseAnalog2	Word	26	05:02:32:765	Good	2
Channel1.Elpro905G.Gateway.RiverRoomAnalog1	Word	42	05:02:32:765	Good	2
Channel1.Elpro905G.Gateway.RiverRoomAnalog2	Word	57	05:02:32:765	Good	2

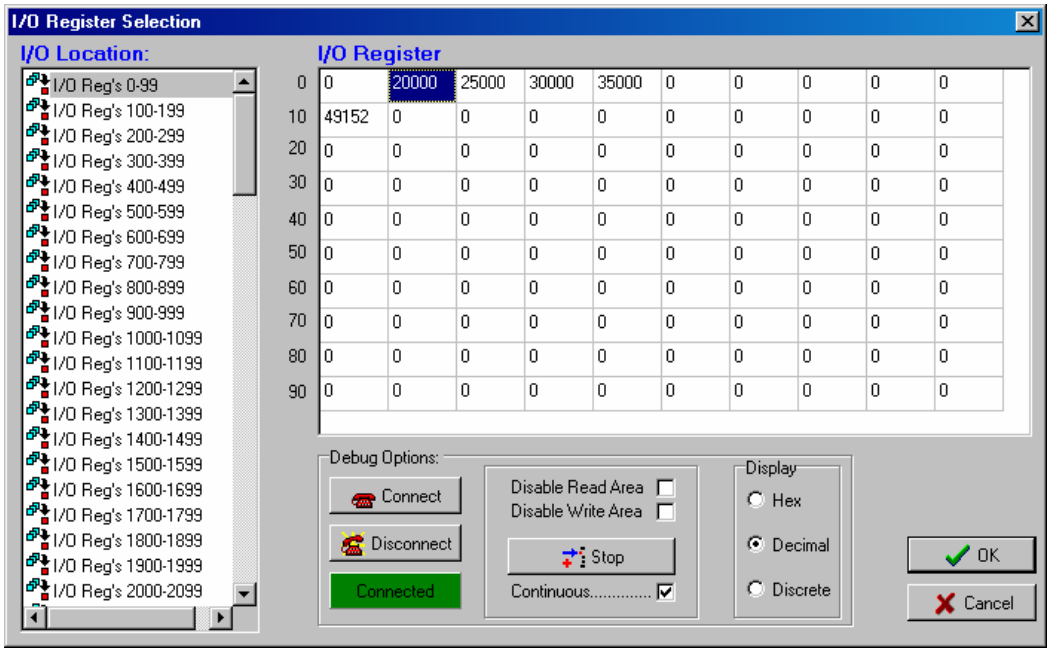
If the OPC Server is reading values from the Gateway you will see under “Quality” – Good. It will show “Bad” if there is a communications problem.
Also you will have a value which is the scaled value from the Gateway registers.

You can view the current values in the Elpro registers by using online diagnostics over an Ethernet Connection to tags show the correct values or debug any problems

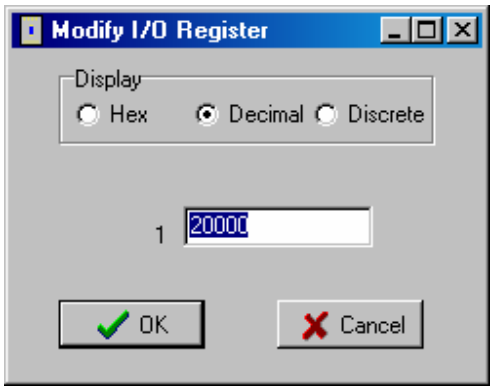
Select Ethernet Settings in Configuration Program, Select Debug I/O Regs and confirm that you want to debug the I/O registers at IP address.



Press “Connect” button and you should get a Green Connected indication. Then tick “Continuous and press “Read” button.
The E-series configuration will now be continuously scanning the I/O Database in the 105/905U-G.



Back in the 105/905U-G Configuration section we configured Registers 1,2,3,4 to be written across to the Fieldbus location 1,2,3,4 (Modbus Tag Commands 30001,30002, 30003, 30004) and also Fieldbus location 1025 (Modbus Tag Command 41025) is being read into Reg 10. We can edit the registers in the I/O Register Selection Window by double clicking on the register which will open a modufy box like this



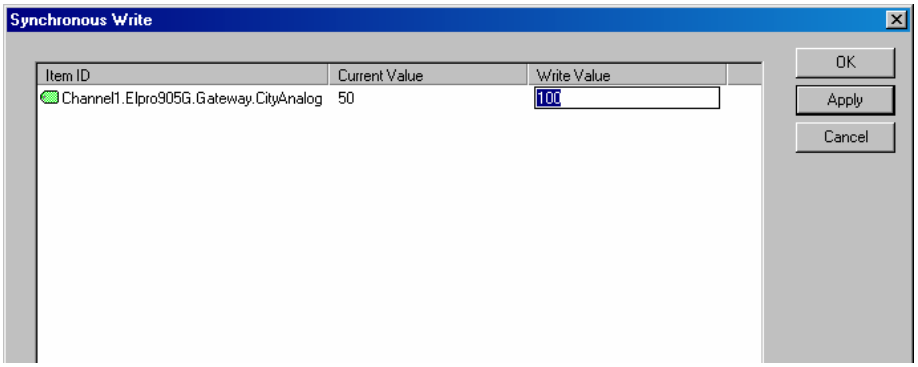
From here we can enter a value into the register in the available formats i.e Hex, Decimal or Discrete. Then press “OK” and you should notice the Tag Value change on the OPC Server screen

You will see each of the Tags in the OPC Server Correspond s to the values entered into the Debug I/O screen

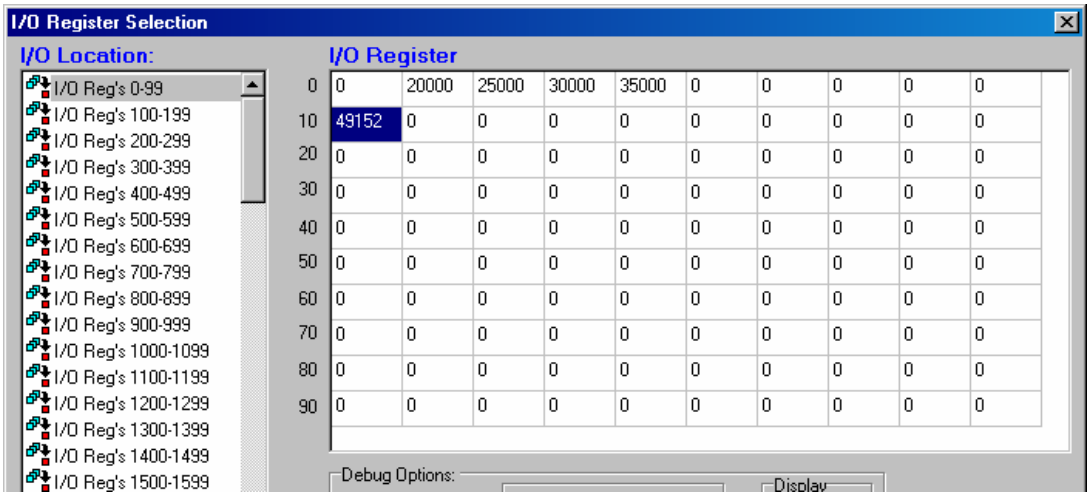
Item ID	Data Type	Value	Timestamp	Quality
Channel1.Elpro905G.Gateway.CityAnalog	Word	50	05:02:32:765	Good
Channel1.Elpro905G.Gateway.MelroseAnalog1	Word	11	05:02:32:765	Good
Channel1.Elpro905G.Gateway.MelroseAnalog2	Word	26	05:02:32:765	Good
Channel1.Elpro905G.Gateway.RiverRoomAnalog1	Word	42	05:02:32:765	Good
Channel1.Elpro905G.Gateway.RiverRoomAnalog2	Word	57	05:02:32:765	Good

Melrose Analog 1 has a scaled value of 11 for 20000
Melrose Analog 2 has a scaled value of 26 for 25000
River Room Analog 1 has a scaled value of 42 for 30000
River Room Analog 2 has a scaled value of 57 for 35000.

We can now check that we can write a value into the OPC Server and read a value in the Debug I/O reg screen.
Right click the Output Tag in this case it is Channel1.Elpro105/905G.Gatway.CityAnalog and enter a scaled value you wish to change.



You should now be able to go back to the Debug I/O register screen and see that the register has changed. In this case the scaled value was set for 100 % which would change the register value to 49152 (20mA)



CSV File Import and Export

The server supports the import and export of tag data in a CSV (comma separated variable) file. The CSV functions are only available when a Device or Tag Group is selected. Using CSV import and export, tags can be created quickly in the application of your choice.

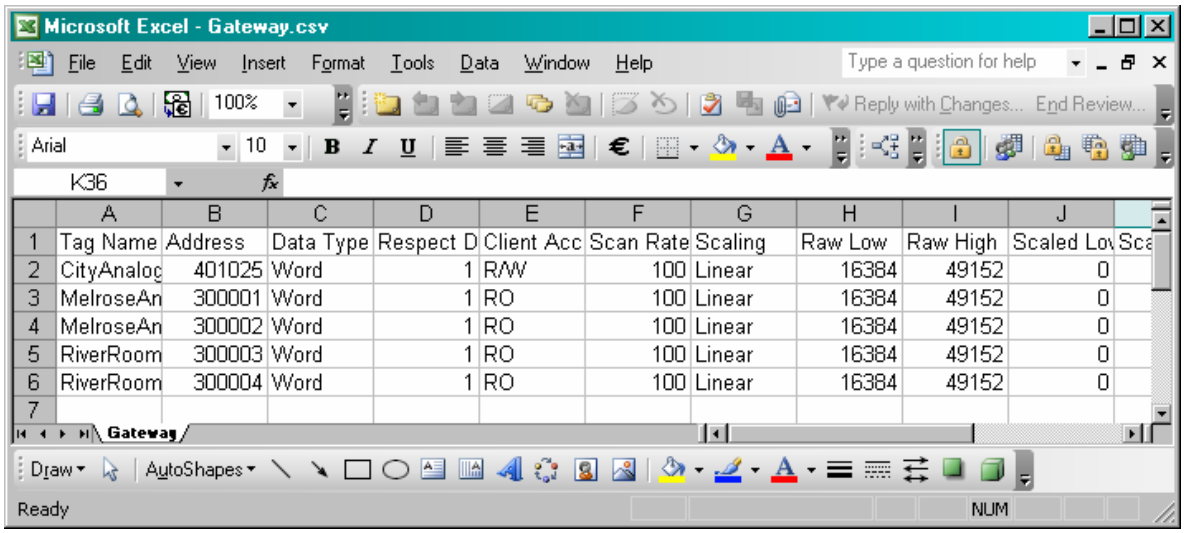
Important Note: The easiest way to create an import CSV file is to create a template using File|Export CSV. Define the channels and devices that the project will contain. Next define a tag for each device. Export each device or tag group as a CSV file. Use this template in a spreadsheet application that supports CSV files and modify the file. The resulting CSV file can then be saved to disk and imported back into the server under the same device or tag group or under a new device or tag group.

Exporting a Server Tag List:
This generates a .CSV (comma separated variable) text file that contains a heading record followed by a record for each tag defined under the selected device or tag group. The heading record contains the following fields.

Tag Name - Name of the tag as it will be referenced in an OPC client.
Address - The device location referenced by the tag.
Data Type - The data type used for the tag as shown in the server Tag Data Type drop down list box.
Respect Data Type - This forces the tag to follow its defined data type not the OPC client request.(1, 0)
Client Access - Read/ Write access (RO, RW, WO)
Scan Rate - The rate in milliseconds that the tag address will be scanned when used with most non-OPC clients.
Scaling - Scaling mode (Linear, Square Root)
Raw Low - Low raw value
Raw High - High raw value
Scaled Low - Scaled low value
Scaled High - Scaled high value
Scaled Data Type - The data type used for the tag after scaling is applied.
Clamp Low - Force the resulting scaled value to stay within the limit of Scaled Low.(1, 0)
Clamp High - Force the resulting scaled value to stay within the limit of Scaled High.(1, 0)
Eng. Units - Units string.
Description - Tag description

Each tag record contains the data for each field in a tag record.

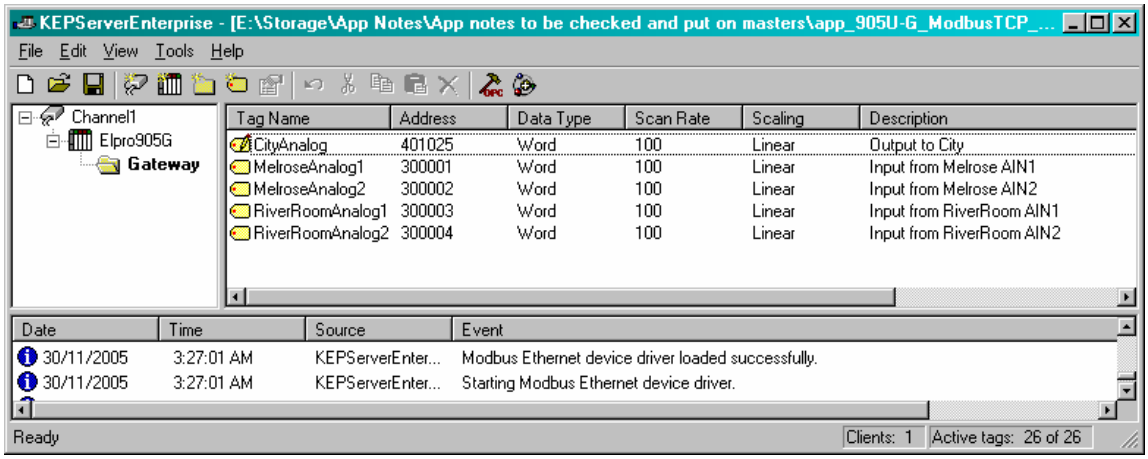
Microsoft's Excel makes an excellent tool for editing large groups of tags outside of the server. Once a template CSV file has been exported is can be loaded directly into Excel for editing. A CSV file load in Excel would appear as follows:



	A	B	C	D	E	F	G	H	I	J
1	Tag Name	Address	Data Type	Respect D	Client Acc	Scan Rate	Scaling	Raw Low	Raw High	Scaled Lo
2	CityAnalog	401025	Word	1	R/W	100	Linear	16384	49152	0
3	MelroseAn	300001	Word	1	RO	100	Linear	16384	49152	0
4	MelroseAn	300002	Word	1	RO	100	Linear	16384	49152	0
5	RiverRoom	300003	Word	1	RO	100	Linear	16384	49152	0
6	RiverRoom	300004	Word	1	RO	100	Linear	16384	49152	0
7										

Importing a CSV tag list into the Server

Once you have finished editing your tag list it can be imported back into the server using the import CSV function File|Import CSV. This option is available only when you have either a device or tag group selected.



Application Note 105/905U-G-ET1 Modbus TCP
Issue 1.2 – Apr 2006

Note: This application note is using the Analog Inputs for testing the communications. When transferring Integer values such as for level, pressure and temp from field 105/905U-1,2,3,4 etc the values will always in the range of 16384 to 49152 for 4-20mA and 8192 to 49152 for 0-20mA.
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Amendment Register:

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1.0	1-10-05	Draft Issue
1.1	6-12-05	Added CSV File Import/Export
1.2	18-04-06	Name Change for 105/905

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ELPRO Technologies Pty Ltd

Application Note: 105U-G-PR2 Profibus Master & Siemens ET200S Distributed I/O

app_105U-G_EIP_1.2.doc

PURPOSE

The purpose of this document is to provide the reader with an application note for using the 105U-G-PR2 Profibus DP Master Gateway with a Siemens ET200 S Distributed I/O system.

This application should be read in conjunction with user manuals for details on powering and programming 105U-G. The reader would also have a firm understanding of the Profibus DP protocol.

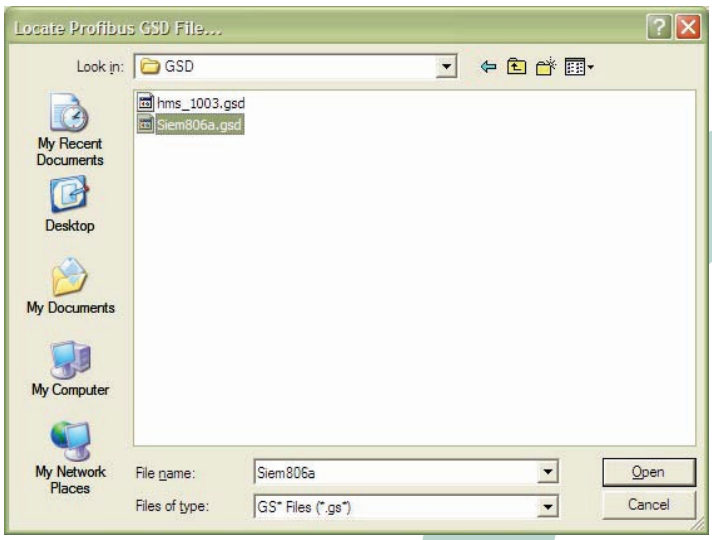
MATERIALS

The materials used for this application were,
Siemens ET200S Distributed I/O,
105U-G-PR2,
GSD File for ET200S,
E-Series Configuration utility (build 1.78 or higher),
RS232 DB9 serial cable (straight through pins 3 & 8),

105U-G CONFIGURATION

The Profibus Master configuration is done is two parts. Profibus Network Configuration and Filedbus Mappings.

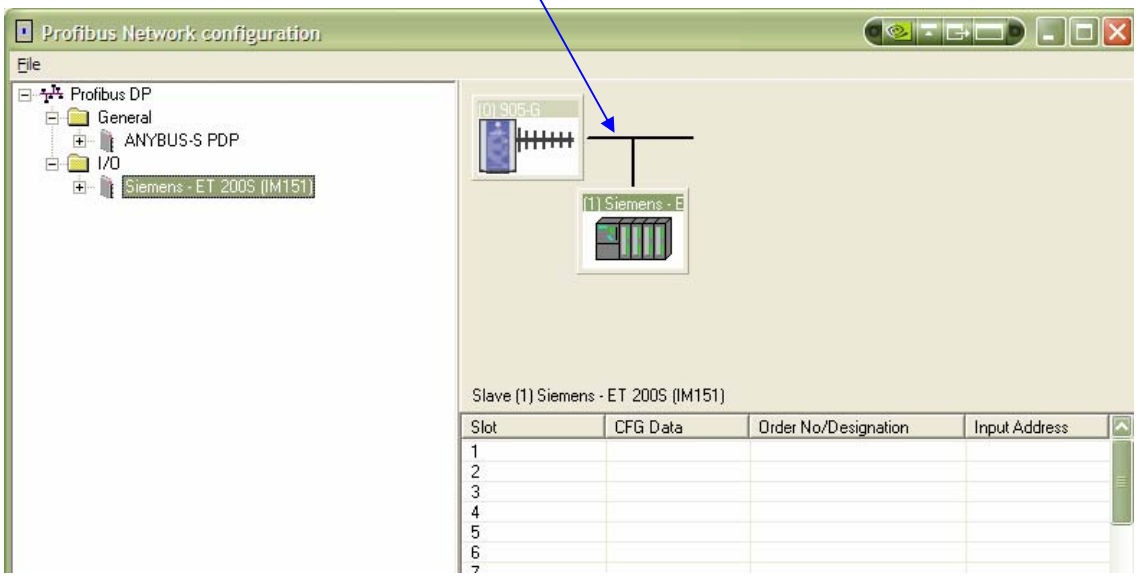
The Profibus Network configuration sets the links between the Profibus Slave Devices and the Profibus Master Gateway. The Fieldbus Mappings links the Profibus Data to the radio network.



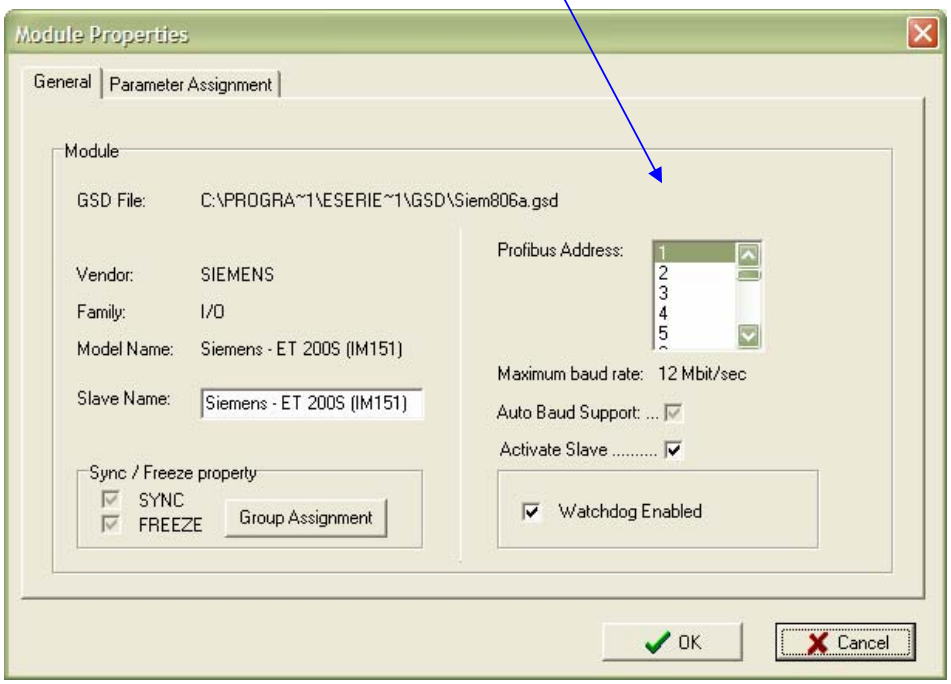
First you need to load the Profibus Slaves GSD file into the E-Series Configuration. Once configuration software has been opened and a Profibus Master Gateway has been created, select the Profibus Network configuraiton then Select “Install GSD File” from the drop down File menu and find the GSD file that

comes with the Slave device (In this case the ET200S). This GSD file has the I/O map for the installed Profbus Slave device and is needed by the software to workout what sort of I/O is available and the addressing.

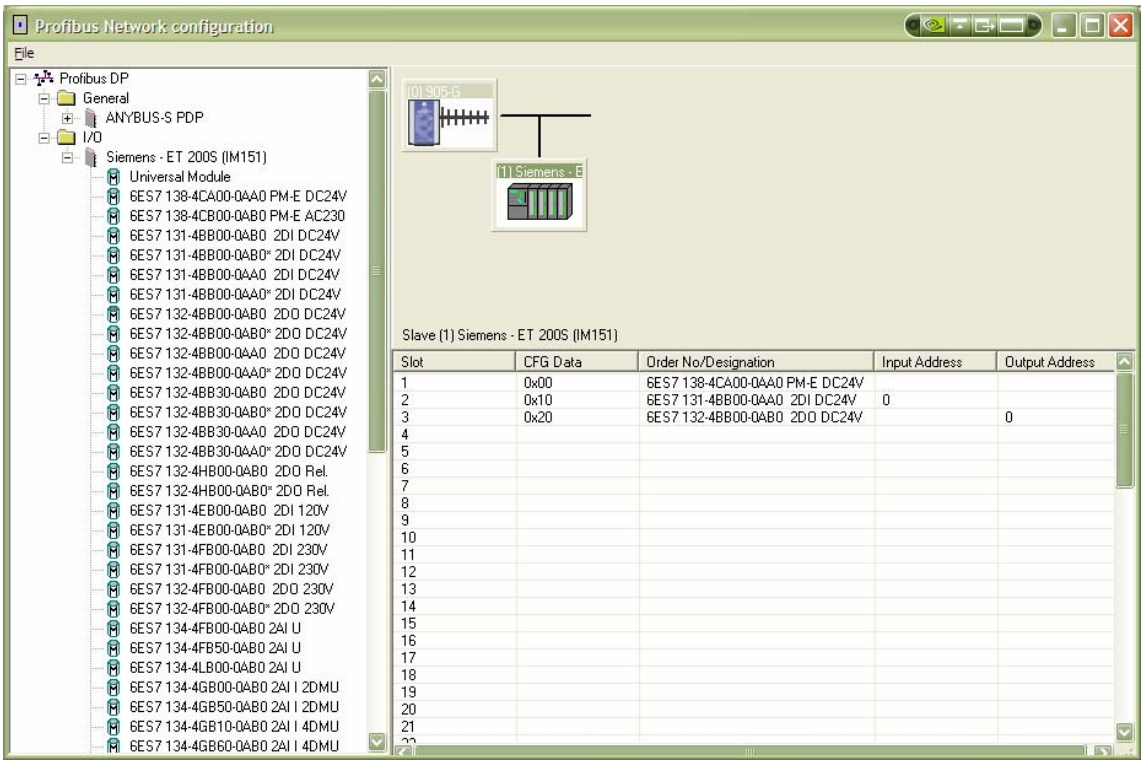
Next find the Slave device in the left hand tree window of the Profibus Network Configuration window. Right click the device being used and select add to network or drag and drop the module onto the network line as shown below. The module can only be added to the network line.



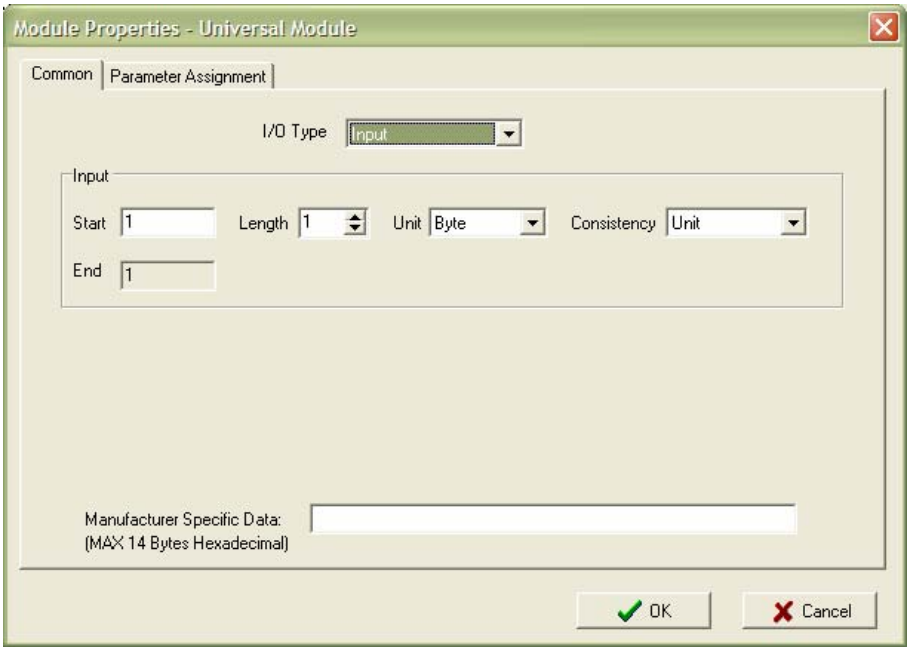
Next Double click on the Siemens ET200S (or other Slave device) to adjust available network settings. See below.
This is were you can set the Profbus Slave address (Address will need to match the Profibus Slave Device.



Open the "+"next to the name of the Profibus Slave device on the left hand tree window and drag the I/O modules installed in the device over to the right hand window and drop them into the appropriate slots. (See below) Making sure that all modules are present including any power supply modules etc. Add each slot as you see them on the slave device.



In the above example we have setup 2 digital inputs and 2 digital outputs. If a module is selected from the list provided, all of the addressing is done for you. If the I/O module is not present or is a special type you can add a "universal module" and assign the start address, length type, etc. Ensure you add all the slots configured for the slave device including power supplies and configuration slots if used.



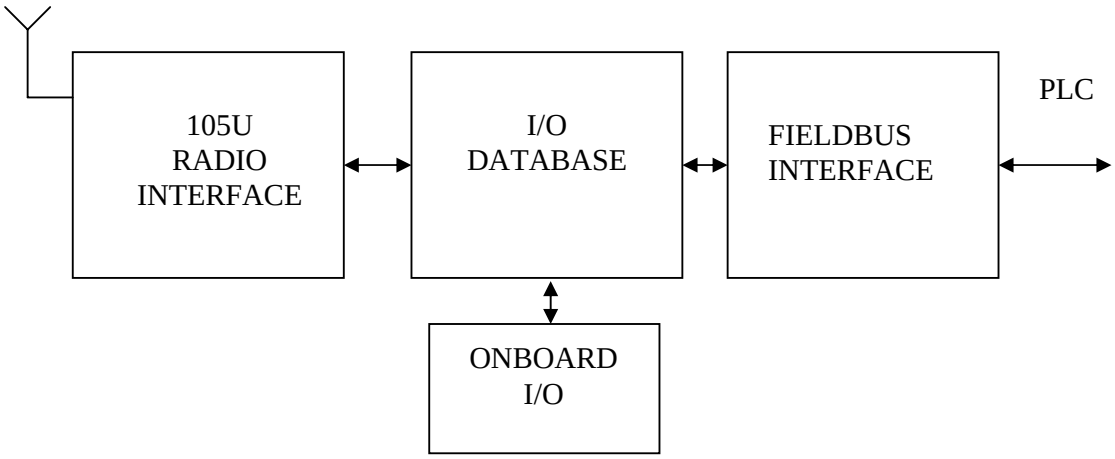
When all I/O has been added, close the Profibus Network Configuration window which will bring you back to the E-Series Configuration window.

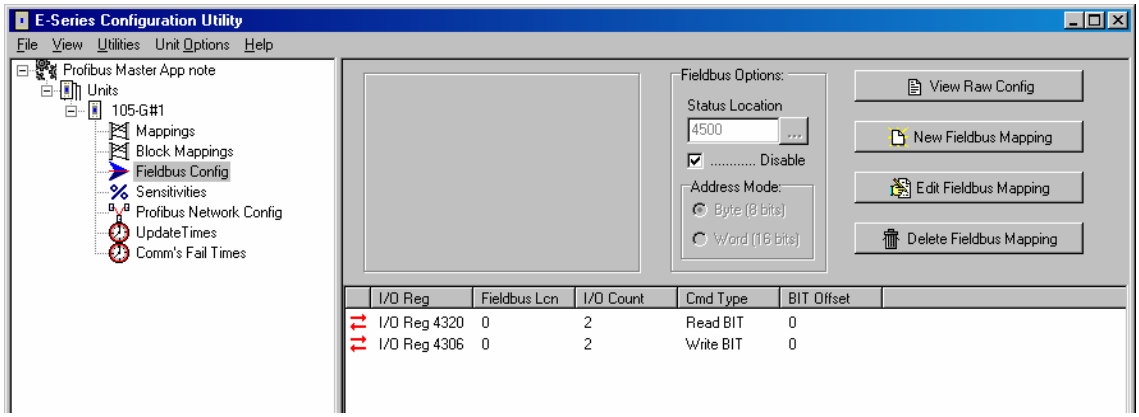
Select "Fieldbus Config" see below.

Gateway

Infrastructure

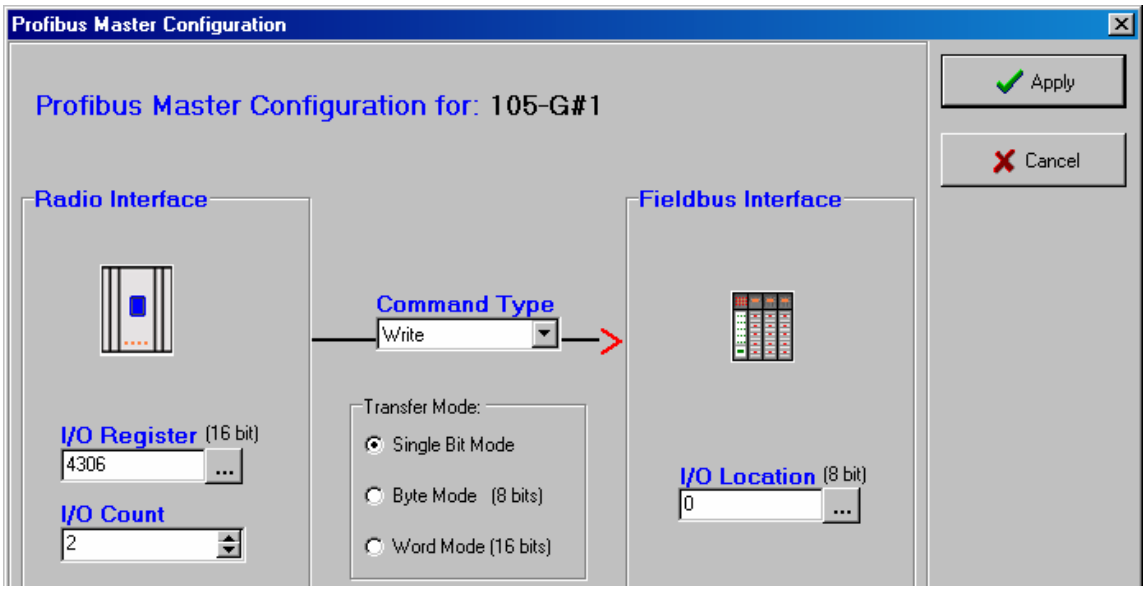
- The gateway has an internal database made up of approximately 4300 16 bit registers.
- Values from remote radio sites come in via the “Radio Interface” and are stored in the “I/O Database” which are then written to the ‘Fieldbus Interface”.
- Values that are read from the ‘Fieldbus Interface” are stored in the “I/O Database” which are then mapped out the “Radio Interface” to remote radio units.
- The Onboard Digital I/O’s are linked to register locations in the “I/O Database” which can be read or written to the “Fieldbus Interface” or mapped to or from the “Radio Interface”.



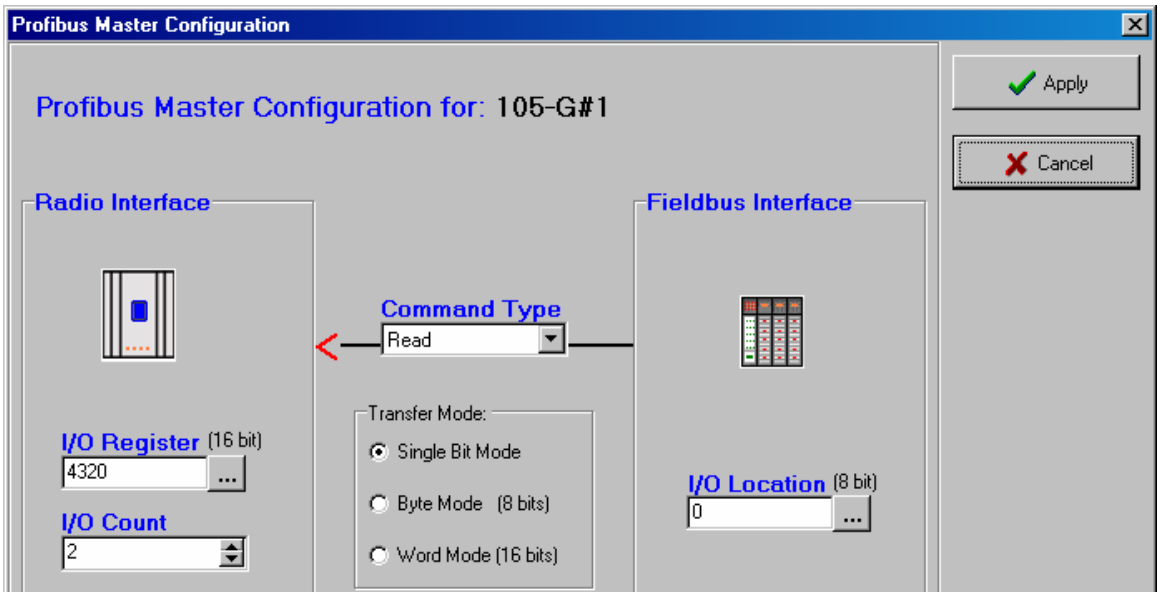


The examples shown in the Fieldbus Config has two mappings, one read mapping of two bits and one write mapping of two bits.

To assign a new mapping select the "New Fieldbus Mapping" button or to edit it just double click on the mapping. The write mapping below shows I/O register 4306 with an I/O count of 2 (4306 & 4307) which will be written to Fieldbus I/O location 0. Registers 4306 & 4307 are the Local Digital Inputs 7 & 8.

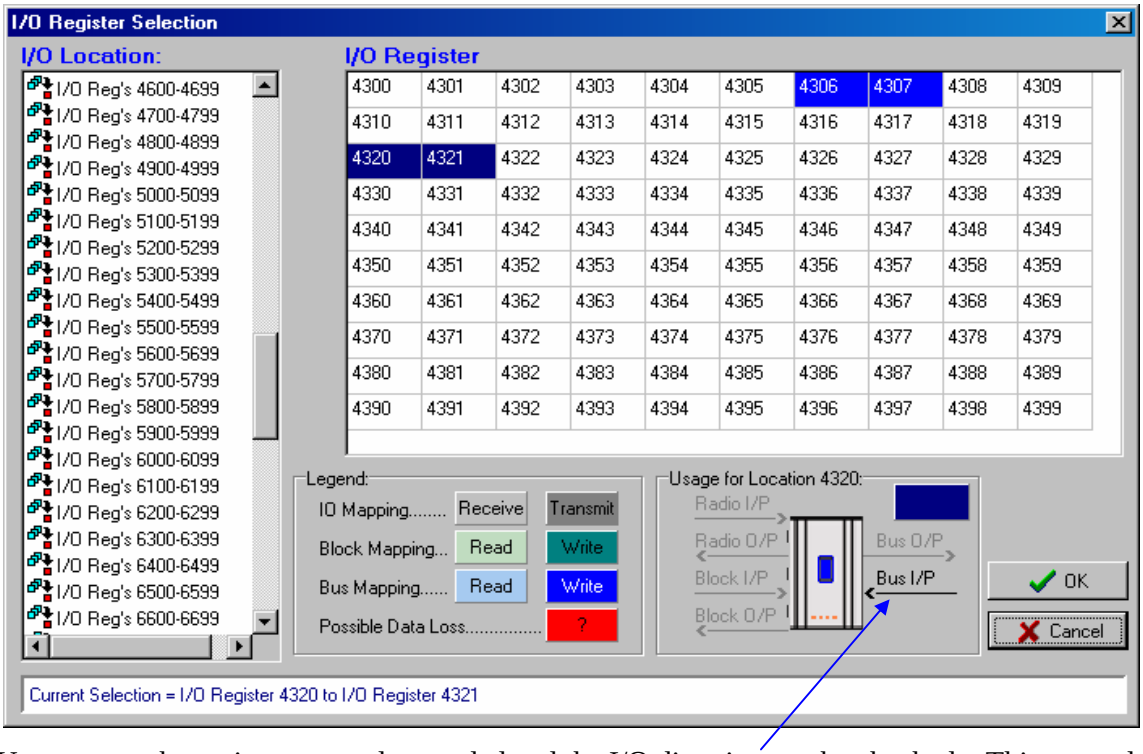


The Read mapping shows Fieldbus I/O location 0 with an I/O count of 2 (0& 1) will be read into Radio I/O registers location 4320 & 4321. Which are the local Digital Outputs 1 & 2.



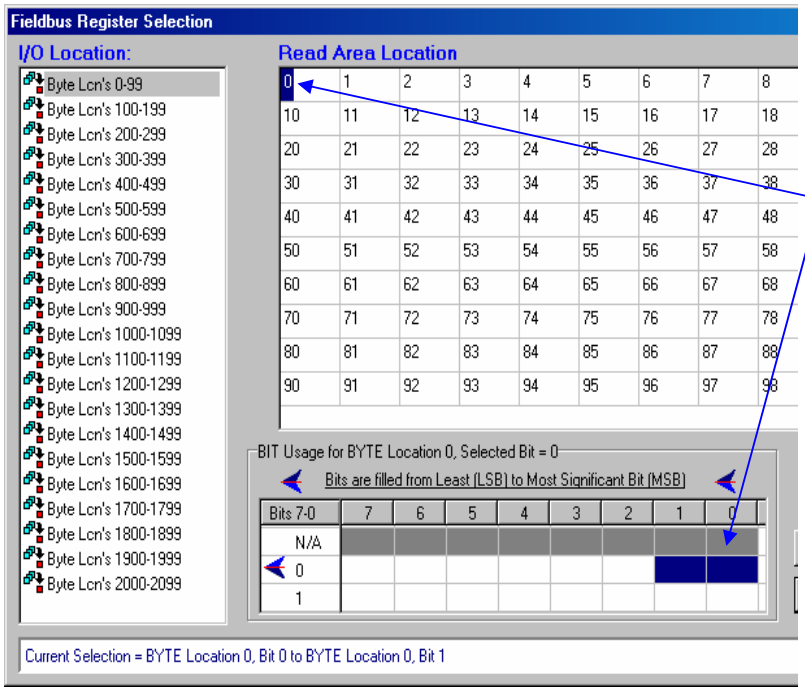
You can select the button next to the I/O Register box in the Radio Interface to show the available registers. See below.

Radio I/O Register



You can see the registers are colour coded and the I/O direction can be checked. This example shows the usage for register 4320 that it has come into the Gateway from the Fieldbus which we have previously selected as a read command.

Fieldbus I/O Location



You can select the button next to the I/O Location box in the Fieldbus Interface to show the available registers.

You will note that this fieldbus mapping is writing two bits into the first byte location.

Fieldbus I/O locations are 8 bit and the available locations are from 0 through to 2047. There are separate read and write area's which range from 0 to 2047.

The only setup needed on the ET200S is the Profibus Address setting that needs to be the same as what was entered in the Profibus Network Configuration at the beginning of the application note.

Once configurations are complete this will need to be downloaded to module via RS232 cable as per manual.

ET200S Operation

This application note was setup to configure two digital inputs from the ET200S to go to two internal registers in the Gateway. From there they can be radio mapped to any other Module in the system. Also two internal register are written to the two digital outputs on the ET200 S.
The internal 4306 & 4307 (DIO #7 & 8) have been setup to write their value in to the Digital output #1 & 2 on the ET200S.
Also the two digital inputs on the ET200S have been setup up so that their values are written into I/O registers 4320 & 4321 (DIO # 1 & 2).
This way you get a visual ON/OFF indication on the Gateway module making it easier to establish if communications is successful or not.

If you turn on one of the digital inputs on the Gateway (DIO7 or DIO8) this will write a value of FFFF hex into one of the registers 4306 and 4307. These Registers are then fieldbus mapped across to the Fieldbus area which inturn is then configured to turn on the digital outputs on the Slave Device.

From the ET200S if you turn on any of the digital inputs a value of FFFF is read from the Slave Device and then mapped across to registers 4320 or 4321. The DIO LEDs 1 & 2 would also be lit on the 105U-G.

Online Diagnostics

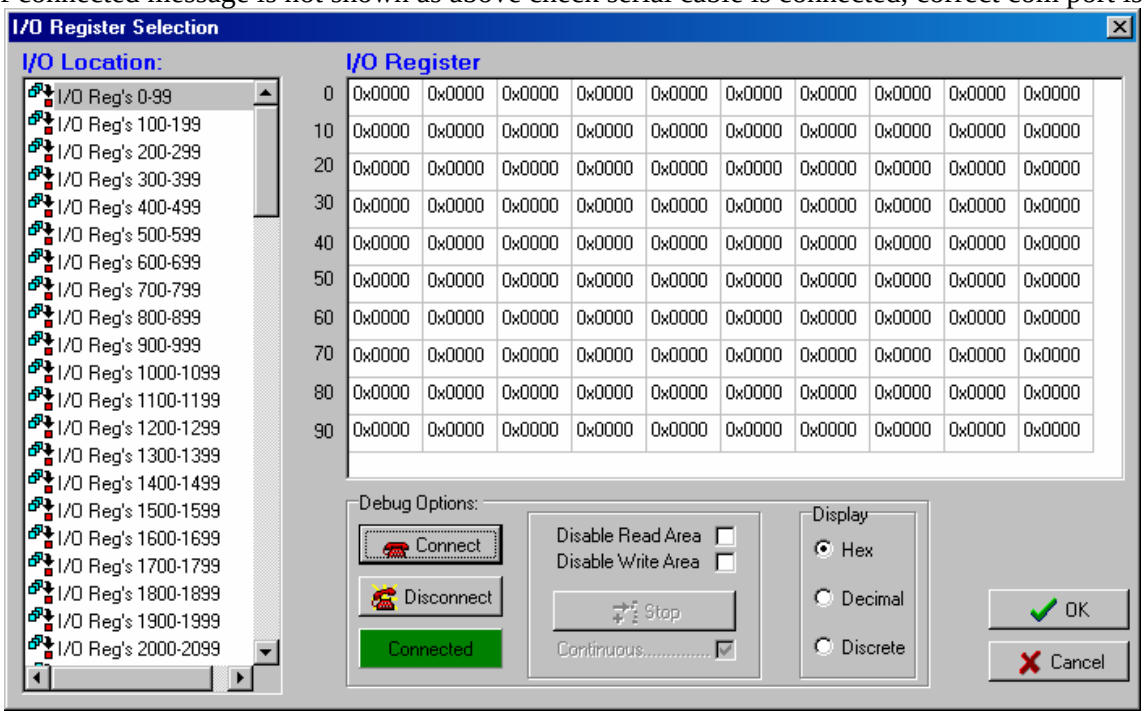
Depending on Firmware version of the Gateway the Online Diagnostics can be done in one of two ways. The Firmware version can be found from the module serial number located on the underside of the module. The firmware version is written in digits 5 through 7 of the serial number, so a module with serial number 0405**170**9468 has firmware version 1.70

To Diagnose the Gateway whilst connected to the Profibus network this is done via the online diagnostics whilst connected to the configuration RS232 port and using the E-series configuration program.

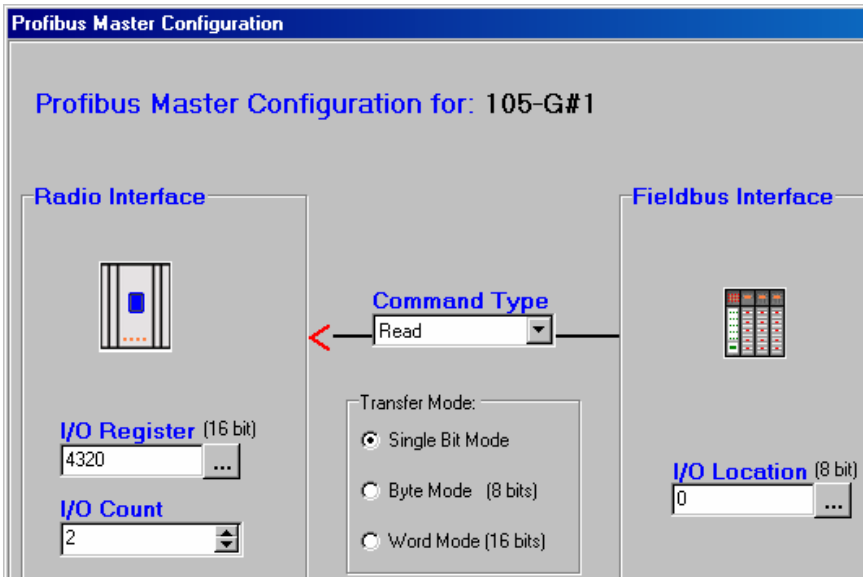
For Firmware versions 1.70 or higher.

Select the Profibus Master Gateway unit in the configuration software. On the right hand side under program unit select Diagnostics. Then in the next screen select Debug I/O.
Under Debug Options select Connect and the following screen should appear.

If connected message is not shown as above check serial cable is connected, correct com port is

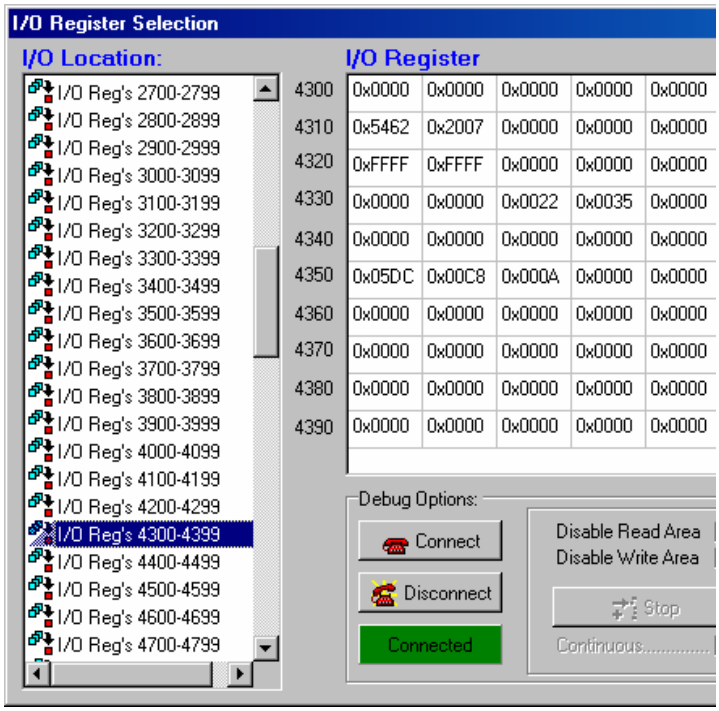


selected and cable is straight through serial cable.

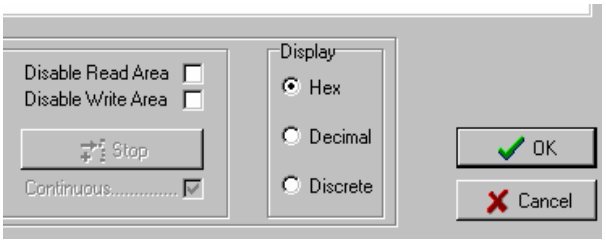


To view values coming in from the Profibus Slave device select the I/O Register location used in the Fieldbus Config Read mapping.

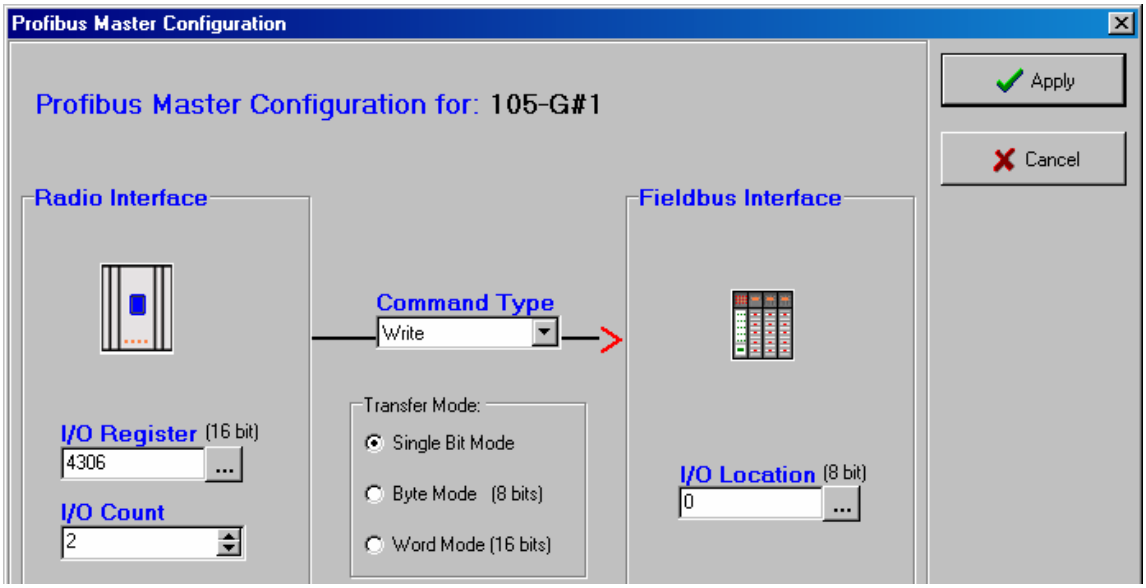
From this application note we are reading 2 bits into register locations 4320 and 4321 as shown from above Fieldbus Config mapping. Once the I/O location is selected from left hand menu the list of 100 registers is shown. Registers 4320 and 4321 both have hexadecimal value of FFFF indicating that the inputs on the slave device are on. Digital Outputs 1 & 2 should also be on at the Gateway.

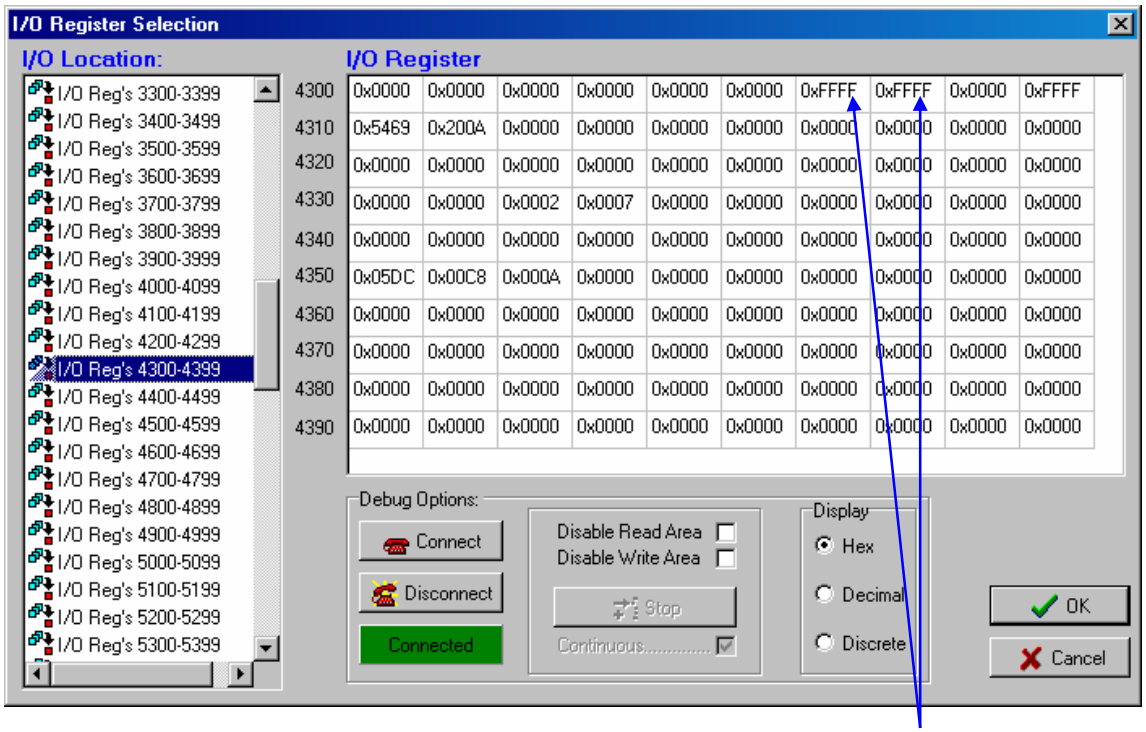


The values of the registers can be displayed in 3 formats Hex, Decimal or Discrete (1 or 0).

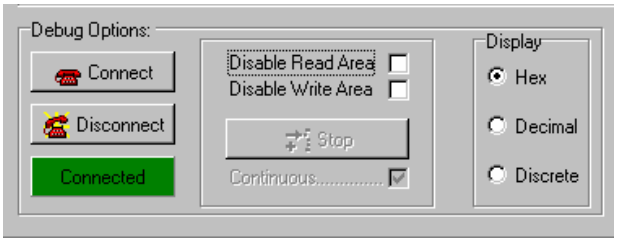


To turn on the Digital outputs on the slave device this application note uses Digital inputs 7 & 8 (Regs 4306 & 4307 in the Gateway) as shown below from Fieldbus Config mapping.

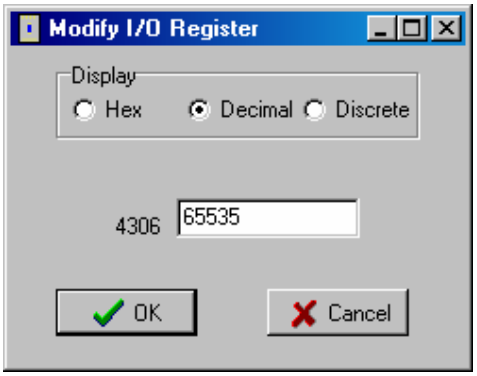




Once the Digital inputs are turned on the register locations 4306 & 4307 are filled with FFFF indicating that the inputs are on and will be written to the Fieldbus I/O location configured, which in turn turns the Digital outputs on the ET200S on.



The Disable Read Area and Disable Write Area are used when diagnostics are needed for configurations over the radio network.



If you can read values from the slave device but are not able to get them sent to the correct destination or you believe values are incorrect you can select Disable Read Area. This will stop the Slave device overwriting values from the Fieldbus Interface into the I/O database so you can then double click on a register location that is being mapped over the radio network enter in a value and check it at the destination module to confirm correct location and value.
Once this has been confirmed ensure that the Disable Read Area has been deselected.

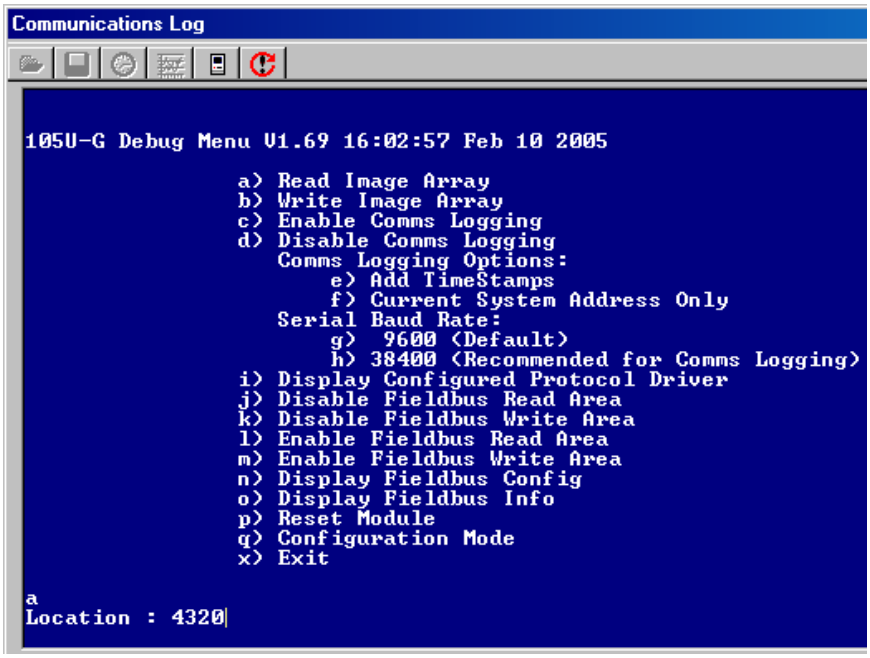
If you want to do local diagnostics to view values coming in from the radio network without sending value to the Profibus Slave device and you can not disconnect the Profibus cable due to creating a possible Bus Failure for other devices on the network you can select Disable Write Area. This will stop any values being written to the Fieldbus and onto the Profibus Slave device. Once this testing is completed ensure that the Disable Write Area has been deselected.

For Firmware versions below 1.70.

To Diagnose the Gateway whilst connected to the Profibus network is accessed via the online diagnostics as per the manual. Refer to the manual for setting up the online diagnostics.

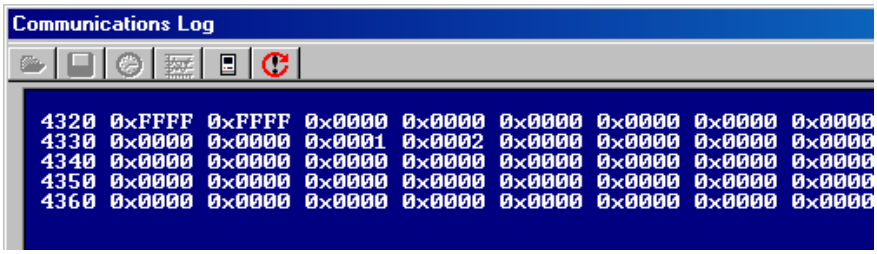
Select the Profibus Master Gateway unit in the configuration software. On the right hand side under program unit select Diagnostics then Terminal. A flashing Cursor will appear in top left hand corner of screen select <ENTER> on keyboard and flowing menu will appear.

To view data being sent from the Profibus Slave device we perform a read image array at the Radio Interface location in the Fieldbus mapping.



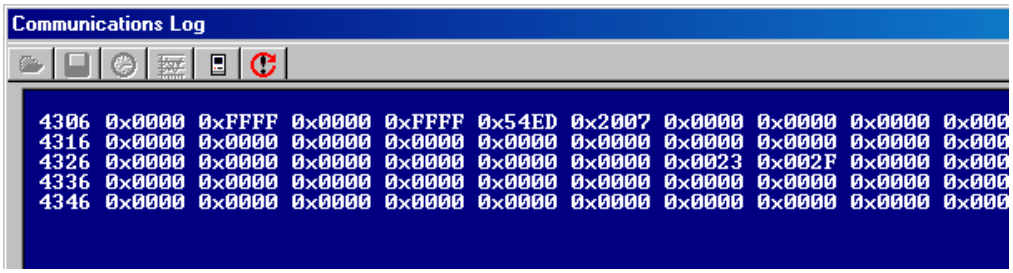
Once in the Online Diagnostics select a) Read Image array and when prompted the Location of the Radio Interface Location

Locations 4320 and 4321 both show hexadecimal value of FFFF indicating that the 2 Digital Inputs from the Profibus Slave device have been turned on. This screen shows 50 registers from the starting location entered above (4320). 10 registers per line are shown in the full screen.



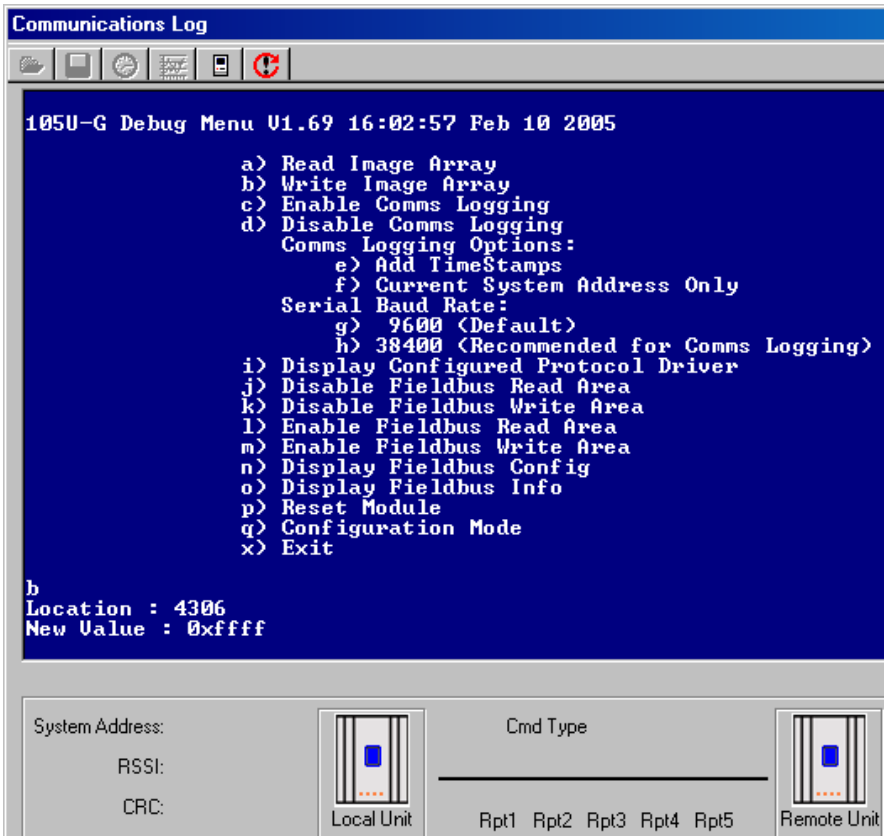
From this example above registers 4320 & 4321 both indicate that the inputs from the slave device are ON which should also have the Digital Outputs 1 & 2 on the gateway ON.

To diagnose turning the Slave outputs on from the local Digital Inputs you can read the register locations for the digital inputs which are at I/O location 4306 & 4307.



Register 4307 has a hex value of FFFF indicating that the Digital Input 8 is on. This will be then written to the Fieldbus location setup in the Fieldbus Config.

If option b) Write Image array is selected then the register location that you want to write to is entered in along with the value that is to be written.

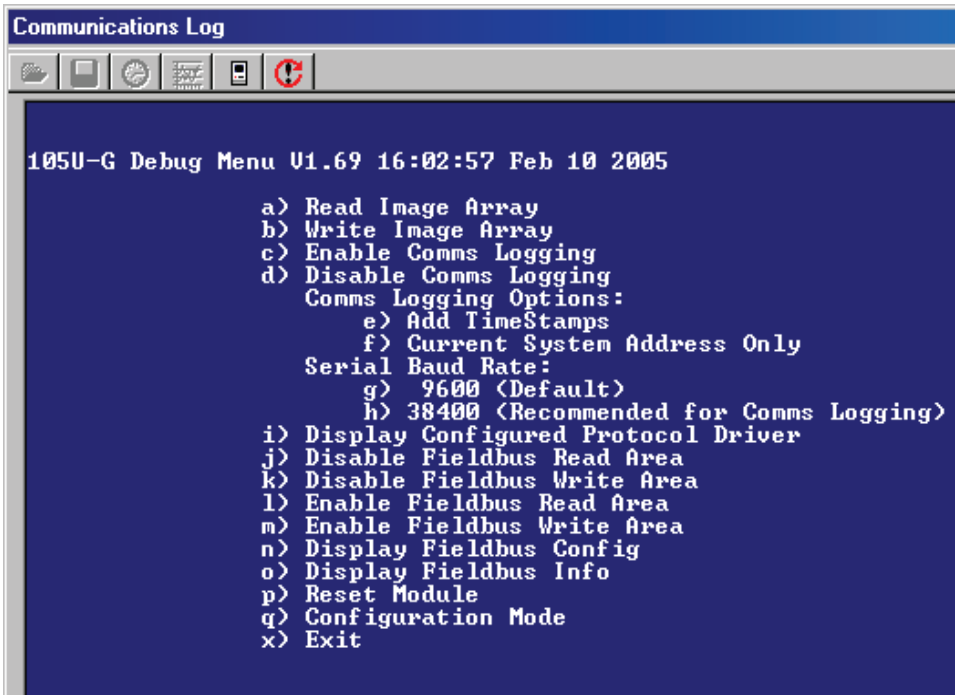


In this example Digital Input 7 (Reg 4306) is used and value of FFFF will indicate the Digital input is on.

NOTE: For this example when using the write image array function for the local Digital I/O on the Gateway the output on the slave device will toggle on then off as the internal structure sees the value written as on (FFFF) then immediately after in the next scan of the I/O database it reads it as an off (0000). If using any other I/O register location the output will stay on at the slave device until the off value is written into the register location again.

The Enable and Disable Fieldbus Read and Write areas are used when diagnostics are needed for configurations over the radio network. If you can read values from the slave device but are not

able to get them sent to the correct destination or values are incorrect you can select j) Disable Fieldbus Read Area. This will stop the Slave device overwriting values into the I/O database so you can select option b) Write image array and put a known value into a register to view at the destination that the register is mapped to over the radio network. Once confirmed register location and mappings are correct select l) Enable Fieldbus Read Area.



If you want to do local diagnostics to view values coming in from the radio network without sending values to the Profibus Slave device and can not pull cable out due to creating a possible Bus Failure for other devices on the network you can select k) Disable Fieldbus Write Area. This will stop any values being written to the Fieldbus and onto the Profibus Slave device. Once this is completed select m) Enable Fieldbus Write Area.

ELPRO Technologies Pty Ltd

Application Note 455U-D Radio Modem with Profibus DP

app_455UD_PROFIBUS_1.0.doc

PURPOSE

The purpose of this document is to provide the reader with an application note for communicating Profibus DP with the 455U-D radio modems.

This application should be read in conjunction with user manuals for details on powering and programming 455U-D modems. The reader would also have a firm understanding of programming and configuration of Profibus devices.

This application note was written around a Point to Multi-Point configuration. However the same settings can be used for a Point to Point configuration.

MATERIALS

The materials used for this application were,
Siemens S7 300 PLC, CPU 314C-2DP,
Siemens ET200S Remote I/O,
Step 7 Programming Software,
455U-D Modems,
455U-D Configuraiton utility,
455U-D Configuration cable, Part No SER-RJ45
DB9 Male (Profibus Connection) to RS485 (455U-D Connection)

CABLES

The cables that need to be used are to be made as follows,

455U-D Configuration cable SER-RJ45

The cable used to program the 455U-D is a RJ45 (Modem end) to DB 9 RS232 (PC End)

To connect to the configuration port, use the following cable pin-out. Only pins 4, 5, 6 on the RJ45 are actually necessary.

RJ-45	Signal Name	Normal Colour	Essential?		DB9
1	Ring Indicator	Green / White	Optional	RI	9
2	Data Carrier Detect	Green	Optional	DSR	1
3	Data Terminal Ready	Orange / White	Optional	DTR	4
4	**Signal Common**	**Blue**	**Required**	**GND**	**5**
5	**Receive Data (from Modem)**	**Blue / White**	**Required**	**RXD**	**2**
6	**Transmit Data (to Modem)**	**Orange**	**Required**	**TXD**	**3**
7	Clear to Send	Brown / White	Optional	CTS	8
8	Request to Send	Brown	Optional	RTS	7
	(Data Set Ready)	(No Connection)	Optional	DSR	6

Profibus Communications Cable

Profibus communications is transported via RS485. However Profibus devices all use DB9 connectors for interfacing

The Profibus RS485 connection should be made only to pins 3 and 8 of the Profibus D9 connector. The pinouts for this connector are:

Pin	Description	455U
1	Not connected	
2	Not connected	
3	**+ve RS485 (Positive)**	**A**
4	RTS (request to send)	
5	GND - Isolated GND from RS485 side	
6	+5V - Isolated 5V from RS485 side	
7	Not connected	
8	**-ve RS485 (Negative)**	**B**
9	Not connected	

Power Connections

The 455U-D module is powered either by a 12 - 15VDC supply, or a 15-28VDC supply. Minimum 24 Watt capacity.

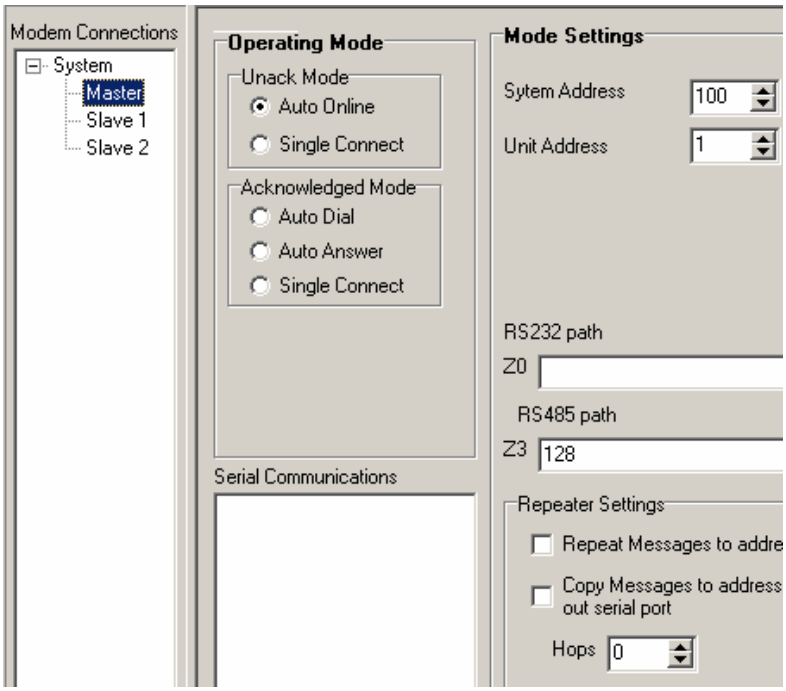
The 12-15 V Supply may be used to charge a backup battery (12V Lead-acid) when the main supply is available, and the module will automatically change over to run from the backup battery in the case of main supply failure.

For DC supplies, the negative side of the supply is connected to “ground”. The supply negative is connected to the module case internally. The positive side of the supply **must not be connected to earth.** The DC supply may be a floating supply or negatively grounded.

The power requirements of the 455U-D units is 90mA at 12VDC (Quiescent) and 2A at 12VDC when transmitting (5Watt).

455U-D Modem Configuration

Configuration can be made via the 455U Configuration Utility or via Hayes commands using a terminal package such as ProComm or HyperTerminal. User manual will give full details on the actual addressing formats. Below is a brief overview of the settings needed.

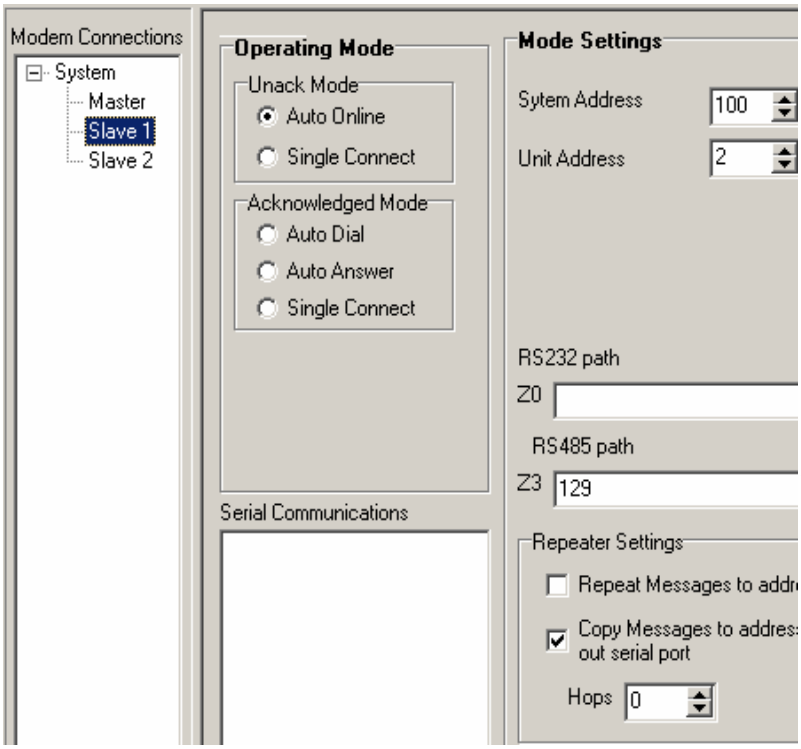


System Address to be the same for all modems.

Unit address to be different on each modem.

RS485 Path is for the Address that the message will go to. 128 is Broadcast Address for RS485.

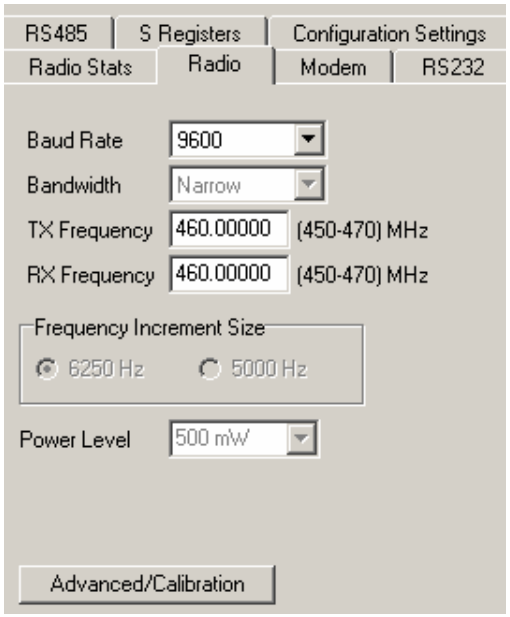
Refer user manual for further information on addressing.



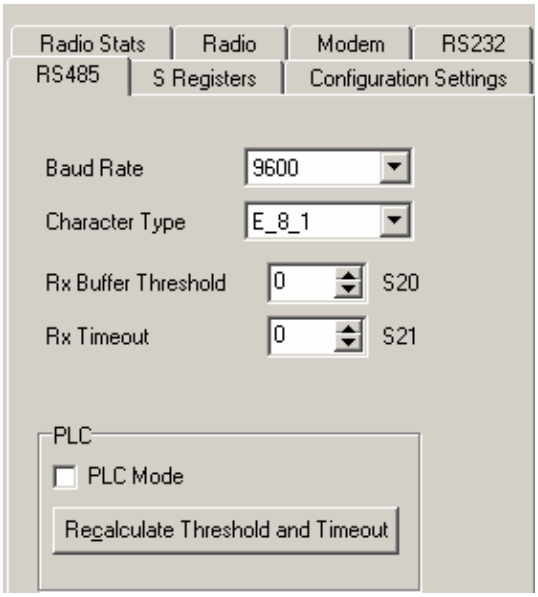
Return messages RS485 Path Address 129 is indicating that all messages will go back to Unit Address 1.

This box must be checked when using Broadcast feature on all remote Slave modems

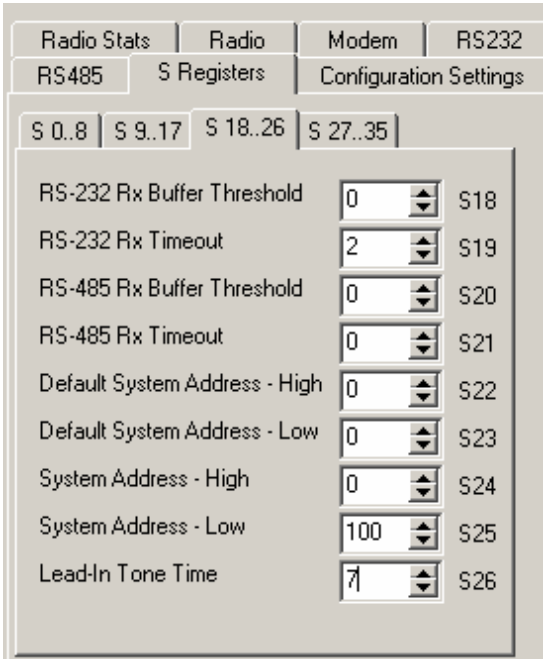
Radio Tab: Ensure all modems radio settings are at 9600 baud



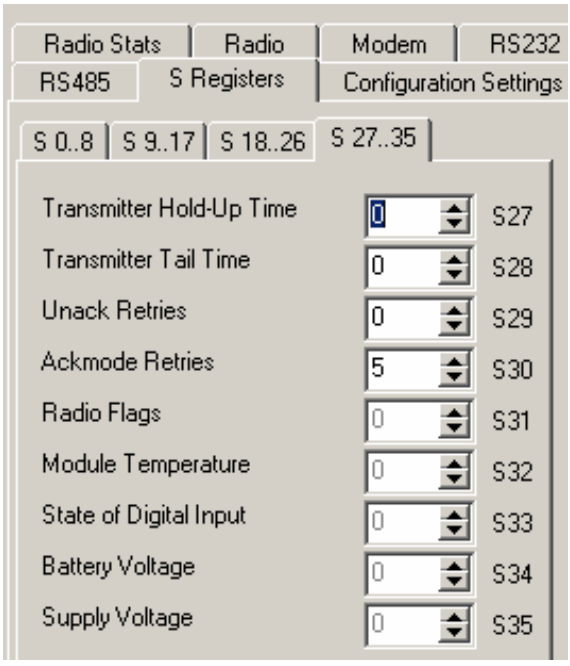
RS485 Tab: Ensure all modems are set to the following format. Note Parity is Even.



S 18...26 Tab: Set Lead-In tone time to 7



S 27...35 Tab: Set Transmitter Hold-Up Time to 0



Configuration can be performed using a terminal package and entering in the associated AT commands to set the modems up. Refer to manual for all register definitions.

Points to note are,
ATS26 Radio Lead-In Tone Time to be set to 7. (Default 10),
ATS27 Transmitter Hold-Up Time to be set to 0 (Default 60)
&Z3 = 128 (broadcast to all remote units) set at Master Modem
&Z3 = 129 (return path for all remote modems to unit address 1) set at all Remote Modems.

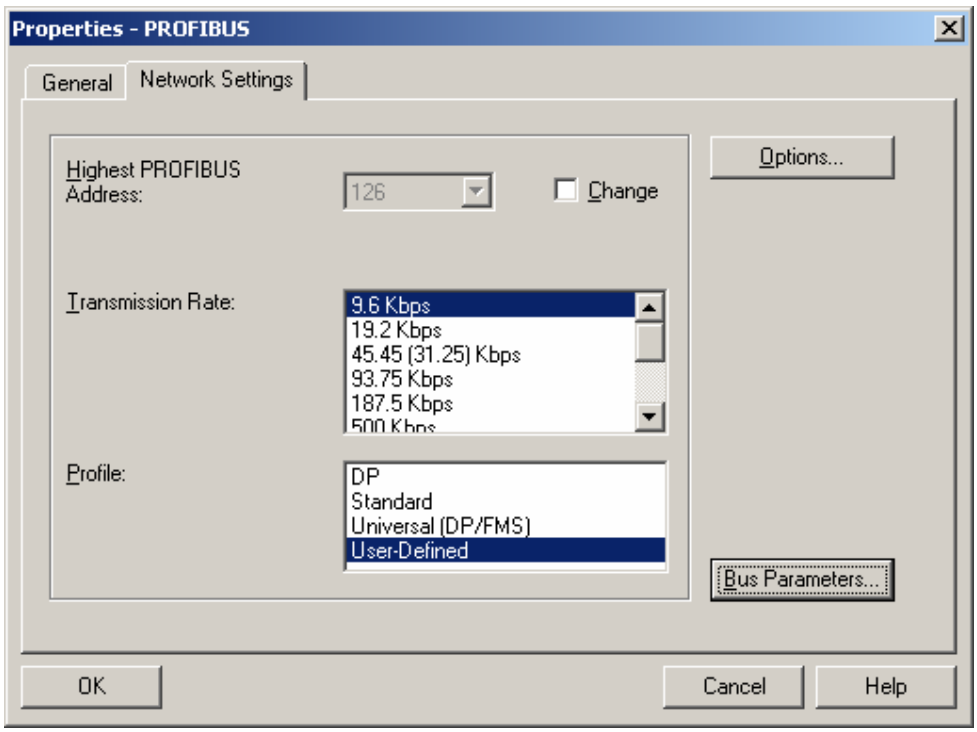
OK
at&v
B3 C7 E1 Q0 V1 X1 &B0 &C1 &D0 &E0 \C6 \N1 \P0 &K0 &L1 &M0 &N1 &U1 \K0 \T60
#A0 #E0 &A4 R5 #O0 &H0 &R0

FT=460.0000 (450.0000-470.0000) FR=460.0000 (450.0000-470.0000)

S0:0 S1:3 S2:43 S3:13 S4:10 S5:8 S6:0 S7:5 S8:0 S9:78 S10:3 S11:0 S12:0
S13:1 S14:50 S15:0 S16:0 S17:0 S18:0 S19:2 S20:0 S21:0 S22:0 S23:0 S24:0
S25:100 ***S26:7 S27:0*** *S28:0 S29:0 S30:5 S31:8 S32:71 S33:0 S34:133 S35:141*

&Z0= *&Z1=*
&Z2= ***&Z3=128***

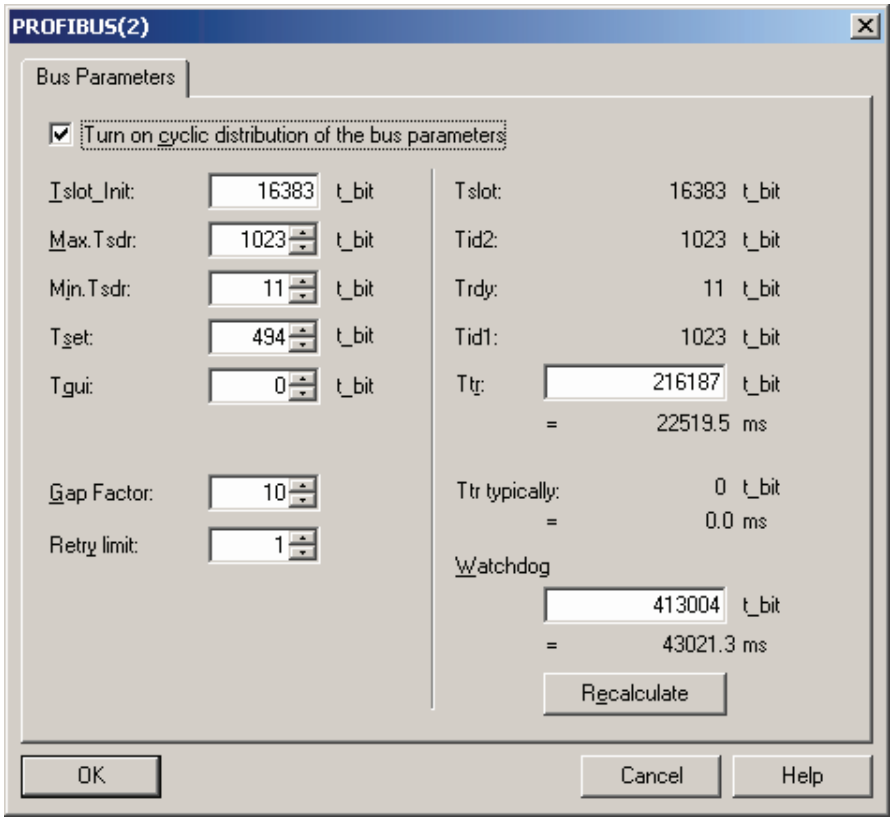
Siemens S7 300 PLC Configuration.



Select Transmission Rate to 9.6Kpbs

Profile to User-Defined

Select Bus Parameters Button



Adjust Parameters to values as shown.

Download new settings to PLC and restart with modems connected.

Ensure Cabling between Profibus Devices and 455U-D modems is correct as per above.

When testing ensure that the Signal levels are within an acceptable range so that the signals are not too strong or too weak giving false indications.

Signal Strength levels can be checked whilst testing via the configuration port and using a terminal package. Serial settings are 9600, 8, N, 1.

Enter in command at&t5 (RSSI Measurement) and monitor the rolling average Signal Detect specifications for the 455U-D are -120 to -60dBm.

at&t5
Signal Strength Display
This Sample *Rolling Average*
Min *Max* *Min* *Max*
-109 dBm -099 dBm -113 dBm -075 dBm

Noise Floor

RSSI Level

Amendment Register:

Issue No.	Date	Details of Amendment
1.0	30-11-06	Initial Issue

0508

ELPRO Technologies Pty Ltd

Using ELPRO 805U Radio Modems with Profibus **APP_805U_PROFIBUS_R1-0.Doc**

PURPOSE

The ELPRO 805U radio modems may be used to extend a Profibus Network. The Profibus network must be configured to account for the increased delays in data transmission caused by the radio modems. Also, the profibus network must be connected to the modem correctly to ensure operation of the network. This document describes the configuration required.

Baud Rate Selection

The ELPRO Modems support the following baud rates in common with the Profibus standard. **19200 Baud, 93750 Baud.** One of these rates must be used for the system to operate successfully. For maximum reliability, use 19200 baud for both the Profibus network and the serial port on the radio, and set the radio rate to 19200 baud. For maximum speed, select 93750 baud for the Profibus network, and select 76,800 baud radio rate for 805U modems. The 93750 baud option for the radio modems may not be available from the configuration software. In this case, use a terminal package to set the baud rate to 93750 baud. The command to select 93750 baud is ATC13. Once this command is entered, the modem will change baud rate, so issue the command "ATC13&W" to write the configuration to non-volatile memory. To communicate with the modem again, Set DIP switch 2 on, and reset the modem.

Connection

The ELPRO Modems have two terminals marked "A" and "B" for connection to RS-485 networks. Profibus uses RS-485 standard for it's physical layer network. The two RS-485 lines are labelled "A" and "B" in Profibus networks, however the usage is opposite to the normally accepted RS-485 usage. **This means you must connect Profibus "A" to ELPRO "B" and Profibus "B" to ELPRO "A" for correct operation**.

RS-485 Signal Name	Profibus Signal Name	Pin – Profibus D Connector	Signal Description.
"A"	"B"	Pin 3	Positive Signal – High = Logic "1", Low = Logic "0"
"B"	"A"	Pin 8	Negative Signal – High = Logic "0", Low = Logic "1"

Siemens recommends connecting Profibus terminal "A" to the green wire in a cable, and connecting Profibus terminal "B" to the red wire. To connect to an ELPRO modem to a Siemens Profibus LAN wired in this way, connect the green wire to the terminal marked "B" on the modem, and connect the red wire to the terminal marked "A" on the modem.

Bus Termination

The ELPRO modems have a switch to switch in a terminating resistor. The termination impedance is approximately 330 Ω, which is considerably higher than the recommended value for Profibus networks. Nevertheless, for short distances (< 100 m) this termination will be suitable. For terminating longer segment lengths, a 270Ω resistor should be installed across the "A" and "B" terminals of the modem, resulting in a termination impedance of 150Ω (cable type "A" - 22AWG). Alternatively, install a 180 Ω resistor for a termination impedance of 117 Ω (cable type "B" - 24 AWG).

Profibus Bus Parameters

The ELPRO 805U Radio Modem introduces an additional delay in data transmission. This delay is approximately 8.5 mSec. The Profibus network must be configured for this additional delay.

To account for this delay, the T_Slot parameter (Slot Time) must be adjusted in the Profibus Configuration. The T_Slot parameter must be increased by the amounts in the following table.

The Profibus Master must also increase the delay between successive transmissions to ensure that messages received at the slave are received seperately, and are not lumped together by the modem. This delay is adjusted by setting the Max_T_Sdr and T_Set value in the profibus configuration.

Baud Rate	T_Slot	T_Set	Max_T_Sdr
19,200	1500	200	450
93,750	4000	494	1023

These settings are demonstrated in the following sections for a Siemens S7 PLC.

Configuration for 19,200 baud operation

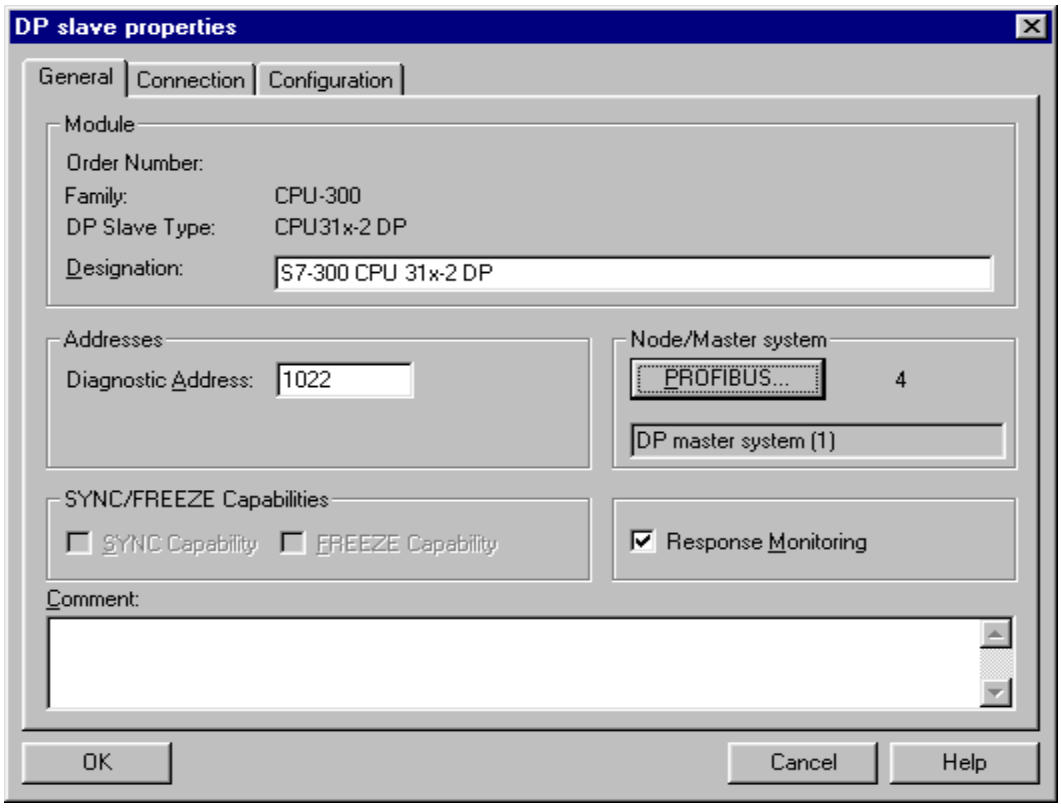
805U Modem Configuration

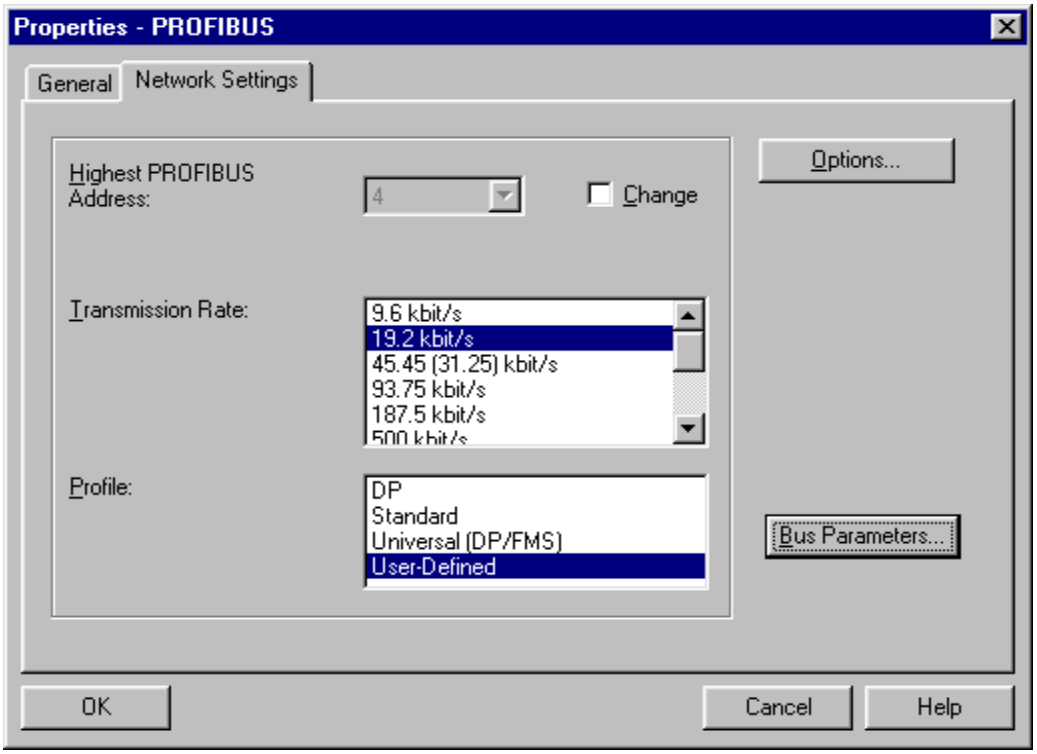
The following table lists the configuration settings for the 805U. From Factory defaults, the following settings are required.
Radio Baud Rate: 19,200 baud (Factory Default)
Serial Baud Rate : 19,200 baud
Character Format: 8 data, even parity, 1 stop.
Error Checking : Enabled
Flow Control: RS-485 Mode (Factory Default except prior to version 1.7).

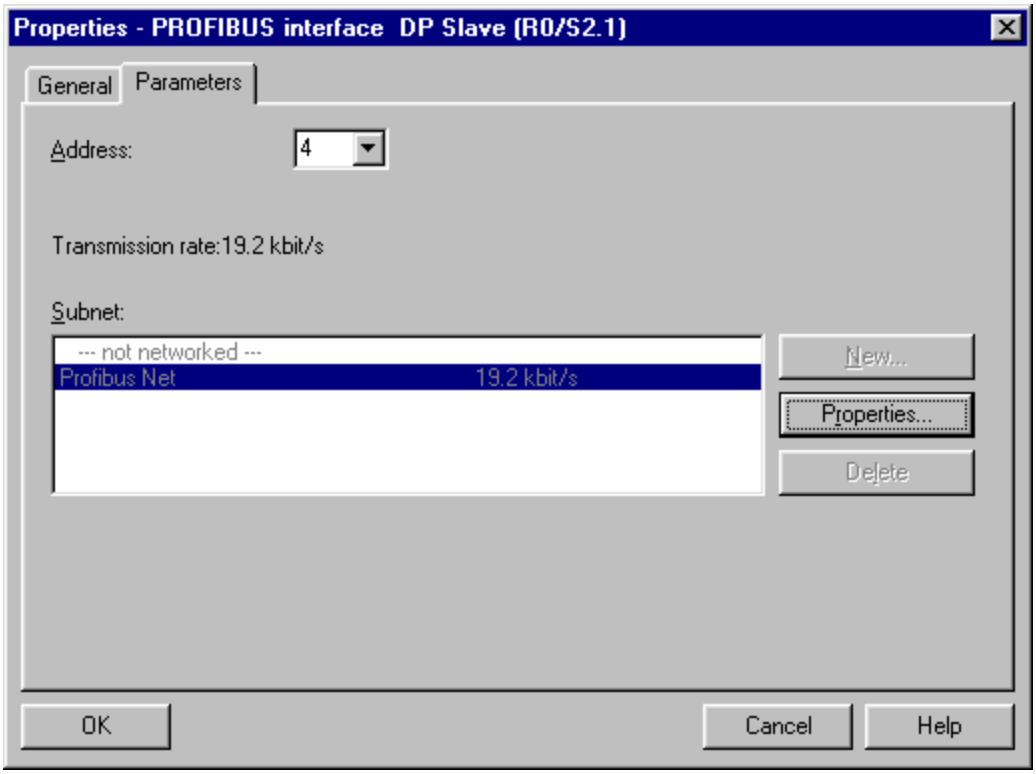
```
AT&F
OK
AT C6 &B14 &E1 &K4
OK
at&v
B0 C6 E1 Q0 V1 X0 &B14 &C1 &D0 &E1 &G0 &K4 &L1 &M0 &N1 &S100 &U1 \T0

S0:1 S1:50 S2:43 S3:13 S4:10 S5:8 S6:0 S7:5 S8:0 S9:85 S10:1 S11:0 S12:1
S13:3 S14:255 S15:0 S16:0 S17:0 S18:0 S19:0 S20:100

&Z0=                                    &Z1=
&Z2=                                    &Z3=

OK
```

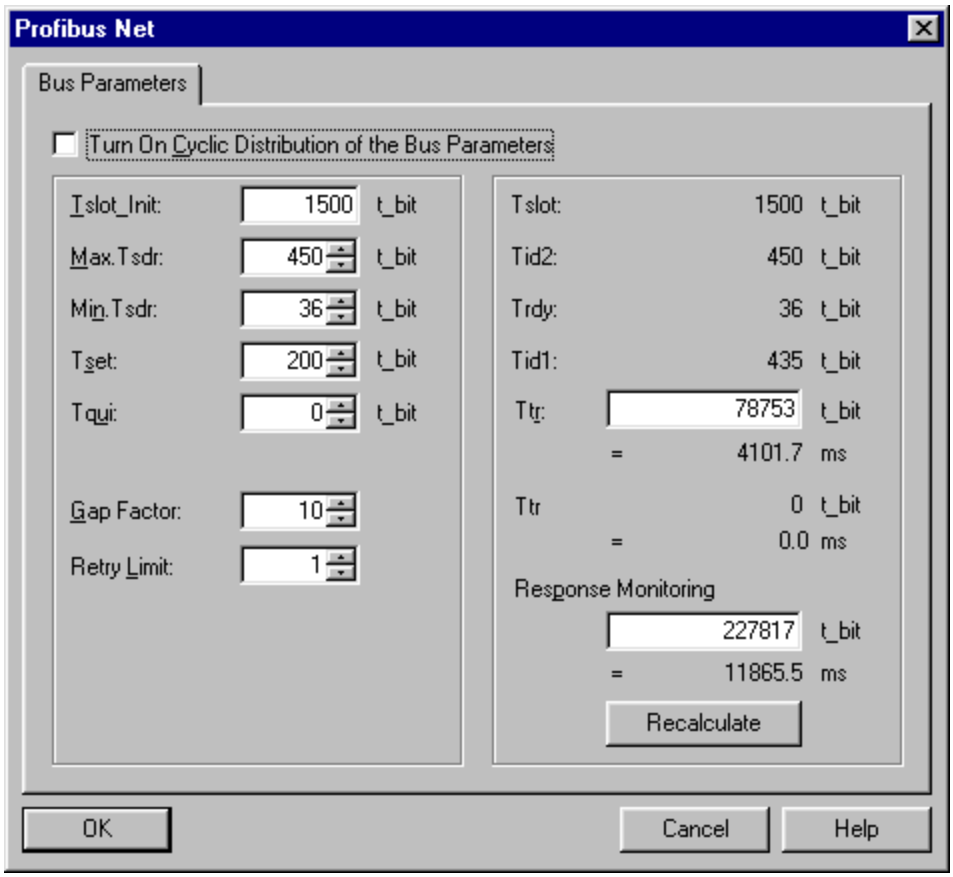
Profibus Network Configuration

The Profibus network is configured with a T_Slot time of 1500, T_Set value of 200 bits, and a Max_T_Sdr time of 450 bits. The Profibus Data rate is set to 19,200 baud. The following diagrams show the screens required for configuration of a Siemens S7 PLC using STEP7 configuration software.


DP slave properties
General
Connection
Configuration
Module
Order Number:
Family:
CPU-300
DP Slave Type:
CPU31x-2 DP
Designation:
S7-300 CPU 31x-2 DP
Addresses
Diagnostic Address:
1022
Node/Master system
PROFIBUS...
4
DP master system (1)
SYNC/FREEZE Capabilities
SYNC Capability
FREEZE Capability
Response Monitoring
Comment:
OK
Cancel
Help


Properties - PROFIBUS
General
Network Settings
Highest PROFIBUS Address:
4
Change
Options...
Transmission Rate:
9.6 kbit/s
19.2 kbit/s
45.45 (31.25) kbit/s
93.75 kbit/s
187.5 kbit/s
500 kbit/s
Profile:
DP
Standard
Universal (DP/FMS)
User-Defined
Bus Parameters...
OK
Cancel
Help


Properties - PROFIBUS interface DP Slave (R0/S2.1)
General
Parameters
Address:
4
Transmission rate:19.2 kbit/s
Subnet:
--- not networked ---
Profibus Net 19.2 kbit/s
New...
Properties...
Delete
OK
Cancel
Help


Profibus Net
Bus Parameters
Turn On Cyclic Distribution of the Bus Parameters
Tslot_Init: 1500 t_bit
Max.Tsdr: 450 t_bit
Min.Tsdr: 36 t_bit
Tset: 200 t_bit
Tqui: 0 t_bit
Gap Factor: 10
Retry Limit: 1
Tslot: 1500 t_bit
Tid2: 450 t_bit
Trdy: 36 t_bit
Tid1: 435 t_bit
Ttr: 78753 t_bit
= 4101.7 ms
Ttr 0 t_bit
= 0.0 ms
Response Monitoring
227817 t_bit
= 11865.5 ms
Recalculate
OK
Cancel
Help

Configuration for 93,750 baud operation

805U Modem Configuration

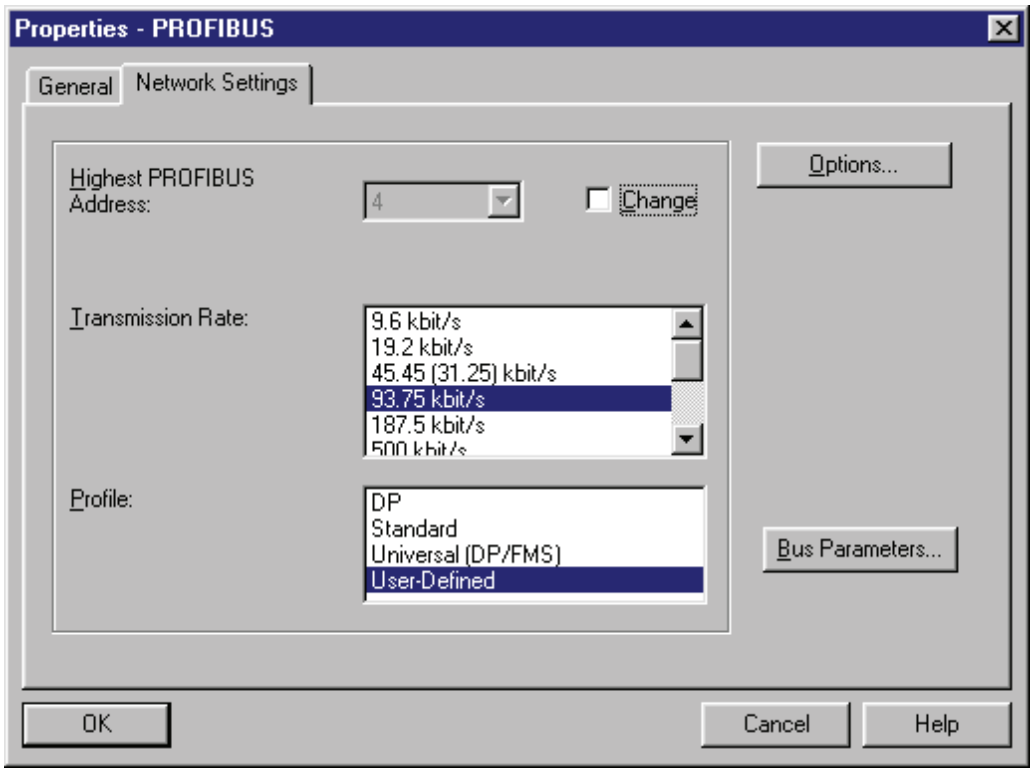
The following table lists the configuration settings for the 805U. From Factory defaults, the followng settings are required.
Radio Baud Rate: 76,800 baud.
Serial Baud Rate : 93,750 baud (Note: requires firmware version 1.72 or later).
Character Format: 8 data, even parity, 1 stop.
Error Checking : Enabled
Flow Control: RS-485 Mode
Note: PC Serial ports cannot be set to the 93,750 baud rate, so the final command should set the baud rate and write the parameters to memory. The following listing demonstrates this. After the final command "atc13&w" the terminal will be unable to communicate with the modem, as the modem will be set to 93,750 baud.

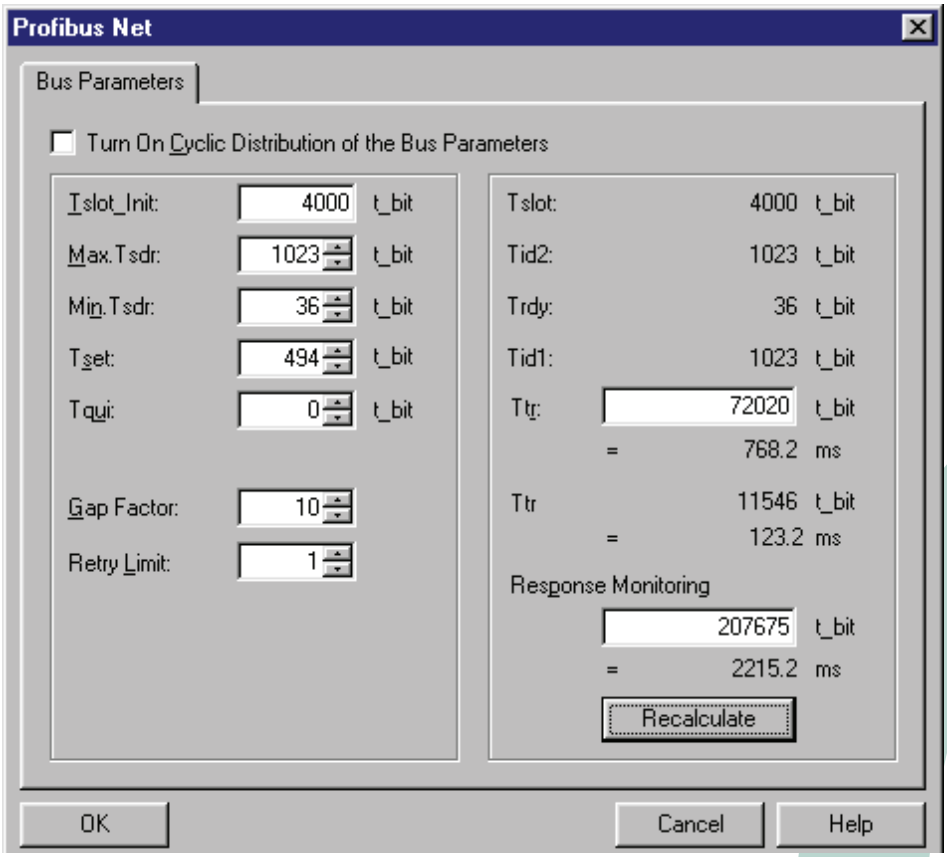
```
OK
ati
905U-D/805U V1.72
OK
at&f
OK
atb2&b14&e1&w
OK
at&v
B2 C4 E1 Q0 V1 X0 &B14 &C1 &D0 &E1 &G0 &K4 &L1 &M0 &N1 &S100 &U1 \T0

S0:1 S1:50 S2:43 S3:13 S4:10 S5:8 S6:0 S7:5 S8:0 S9:0 S10:1 S11:0 S12:1
S13:3 S14:255 S15:0 S16:0 S17:0 S18:0 S19:0 S20:100

&Z0=                                    &Z1=
&Z2=                                    &Z3=

OK
atc13&w
```

Profibus Network Configuration

The Profibus network is configured with a T_Slot time of 4000, T_Set value of 494 bits, and a Max_T_Sdr time of 1023 bits. The Profibus Data rate is set to 93,750 baud. The following diagrams show the screens required for configuration of a Siemens S7 PLC using STEP7 configuration software.

Application Note
Using ELPRO 805U Modems with Profibus





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